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HARD CHOICES

A Report on the Increasing Gap Between America's Infrastructure Needs and Our Ability To Pay for Them

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Appendix 23. WASHINGTON

A CASE STUDY

PREPARED FOR THE USE OF THE

SUBCOMMITTEE ON ECONOMIC GOALS AND INTERGOVERNMENTAL POLICY

OF THE

JOINT ECONOMIC COMMITTEE
CONGRESS OF THE UNITED STATES

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Preface

Infrastructure problems are widespread. They do not respect regional or state boundaries. To secure a better data base concerning national and state infrastructure conditions and to develop threshold estimates of national and state infrastructure conditions, the Joint Economic Committee of the Congress requested that the University of Colorado's Graduate School of Public Affairs direct a twenty-three state infrastructure study. Simultaneously, the JEC appointed a National Infrastructure Advisory Committee to monitor study progress, review study findings and help develop policy recommendations to the Congress.

In almost all cases, the studies were prepared by principal analysts from a university or college within the state, following a design developed by the University of Colorado. Close collaboration was required and was received from the Governor's staff and relevant state agencies.

Because of fiscal constraints each participating university or college agreed to forego normal overhead and each researcher agreed to contribute considerable time to the analysis. Both are to be commended for their commitment to a unique and important national effort for the Congress of the United States.

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THE WASHINGTON STATE INFRASTRUCTURE STUDY

		Page
I	Introduction and Summary	1
	Scope and Methodology	
	Summary of Findings	
	Estimates of Need	
	Recent Trends in Per Capita Capital Spending	
	Real Capital Spending Relative to Income	
	The Interdependence of Needs	
	Conclusion	
II	Highways, Roads and Streets: An Overview	15
III	State Highway Needs and Financing	19
	Present Condition	
	State Highway Programs	
	Needs and Funding, 1983-89	
	Needs and Funding, 1983-2000	
	Sources of Funding	
IV	County Roads and City Streets	28
	Trends in Expenditures	
	Existing Conditions	
	Definition of Needs and Resources	
	Needs and Revenues, 1983-89	
	Needs and Revenues, 1983-2000	
	Sources of Funding	
V	The Washington State Ferry System	40
	Recent Expenditures and Projected Needs	
	Sources of Funding	
VI	Public Water Supply	45
	Expenditure Patterns	
	Goals of Water Planning	
	Future Planning	
	Capital Needs Projections	
	Projecting Future Expenditures	
	Sources of Funding	
VII	Irrigation	57
	Irrigation Districts	
	Outlays of Irrigation Districts	
	Projection of Outlays Based on Irrigation Projections	
	Projections of Irrigation District Capital Outlays Based on Planning Budgets	
	Capital Outlays Projections	
	Capital Needs	

Page

VIII Sewage 66

Expenditures and Funding for Sewage
Estimates of Future Needs
Future Capital Outlays
Sources of Funding

I. INTRODUCTION AND SUMMARY

There is widespread concern that all is not well with the infrastructure of the American economy.[1] Attention is becoming focused upon the inadequacies of the nation's streets, roads, bridges, sewage facilities, the quality of water supply, prisons and other investments which constitute the public infrastructure. By and large, the public infrastructure is provided and maintained by state and local governments and local government enterprises. Inadequate tax revenues, the diminution of federal grants, high interest rates and economic recession make it increasingly difficult to maintain the public infrastructure at acceptable standards. Public works investment in the United States has declined from 4.1% of GNP in 1965 to 1.7% in 1980.

What is the magnitude of the problem? Estimates of combined government spending in the next 10 to 15 years merely to maintain--not to expand--the country's existing public facilities range from a low of $660 billion to $2.5 to $3 trillion; even the low estimate is greater than what state and local governments spent on new investment during all of the past 20 years.[2] An enormous problem confronts the nation, but no one is sure of its dimensions. Which elements of the infrastructure are in most need of attention? Is this a geographical problem confined to a few major cities or regions, or does it broadly affect both the public and private sectors? What can be done about it? Answers to these

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[1] George E. Peterson, Nancy Humphrey, Mary Miller, and Peter Wilson, The Future of America's Capital Plant, The Urban Institute (forthcoming); Patrick Choate and Susan Walter, America in Ruins, Council of State Planning Agencies (1981); Harry P. Hatry, Maintaining the Existing Infrastructure, The Urban Institute (1981); David A. Grossman, "The Infrastructure Blues: A Tale of New York and Other Cities" Governmental Finance (June 1980); George E. Peterson and Mary John Miller, Financing Public Infrastructure: Policy Options, Urban Consortium (1982); Tom Trulove.

[2] Tom Trulove, "The Washington Infrastructure Problem - A Call for Action," a paper prepared for the Washington State Advisory Commission on Intergovernmental Relations (1982).

questions are not easily forthcoming because there is not as yet a clear definition of infrastructure, a consensus on how to measure needs, or an agreed solution to financing the infrastructure gap.

Scope and Methodology

The Washington study is one of a number of state studies that have been undertaken at the direction of the Joint Economic Committee of the Congress to assess the dimensions of the infrastructure problem in the United States. This study is called a "threshold analysis" because it is a preliminary examination intended to provide an initial assessment of the scope of the problem in this region. It is exploratory rather than definitive. Lacking an established methodology for addressing the questions raised above, the authors of this study undertake a broad inventory of readily available resources which may provide preliminary indications of the infrastructure gap in this state. It goes further: the study attempts to provide some rough quantitative estimates of the public capital spending needs over the remainder of this century and (absent new policy initiatives) the prospects of meeting them.

Not all elements which might be classified as infrastructure are included in this analysis. Only public infrastructure needs and spending to meet them are examined, and only for specific sectors: highways (including interstate), streets, roads, water supply, irrigation and sewage. Excluded are elements of infrastructure for education, mass transit, parks and recreation facilities and others that might be included in a more comprehensive survey. It is inclusive of spending by state government, cities and towns, counties, government enterprises, and special government districts, regardless of funding source.

The study methodology for each element of the infrastructure proceeds by reviewing the magnitude of recent spending for capital outlays and maintenance, obtaining estimates of future needs from various governmental agencies responsible

for their provision or regulation, comparing these reported needs with prospective sources of revenue to meet them as indicated by agency spending programs, and projecting these reported needs and revenues to the year 2000. These estimates are approximations subject to more than the usual hazards of forecasting and subject to considerable qualification and refinement, but they provide an indication of the general magnitude of the infrastructure problem in Washington State.

Summary of Findings

Estimates of future capital requirements and outlays to meet them for seven major elements of Washington State infrastructure are summarized in Table I-1. The estimates of needed capital spending and programmed capital outlays shown in Column (1) are based upon planning reports by various agencies, adjusted to 1983 price levels. The needs and outlays projected through the end of the century shown in Columns (2) and (3) are extensions based on past relationships and anticipated population growth. These projections assume a population of 5,178,000 by the year 2000, or a population growth rate of about 1.1% annually from 1983 resident population.[1] The principal conclusions suggested by these projections are as follows:

1. Perceived capital needs over the next 17 years are $22 billion, in 1983 prices, for the seven elements of infrastructure covered by this study. To meet these needs would require real public capital spending at levels more than 1½ times those annual rates which prevailed in the past decade.[2]

---

[1]Population estimates are from Office of Financial Management (OFM) through 1990, and extended to 2000 using Bonneville Power Administration (BPA) projections. See OFM Special Report No. 59 (November 1982), and BPA Forecast of Electricity Consumption in the Northwest, Appendix 1: Economic/Demographic Projections, Table A-1 (May 1982).

[2]Real Capital Expenditures in the decade 1972-81 averaged $786 million per year, in 1983 prices, for highways, roads, streets, ferries, water and sewers. The perceived needs for these six elements of infrastructure from 1983-2000, if met, would require average annual outlays of $1,216 million, also in 1983 price levels.

32-116 0 - 84 - 3

TABLE I - 1

Estimated Future Capital Requirements and Outlays,
State of Washington, 1983-2000
(millions of dollars, 1983 prices)

(1) Program Notes	(2) Capital Outlays Required to meet Estimated Needs, 1983-2000	(3) Estimated Capital Outlays 1983-2000	(4) Capital Needs Gap
1. State and Interstate Highways DOT reports capital needs of $2.4 bil., programmed construction of $1.8 bil., 1983-89	$ 7,172	$ 4,572	$ 2,600
2. Ferry system DOT reports unfunded capital needs of $77 million, programmed construction of $35 million, 1983-89	77	35	42
3. County roads CRAB reports essential capital needs of $1.1 bil., and $37 mil. funded outlays, 1983-88	3,230	1,607	1,623
4. City streets AWC reports essential capital needs of $1,008 mil., and funded outlays of $319 million, 1983-88	2,760	1,614	1,146
5. Water supply No capital needs estimate available; DSHS reports $1.3 bil. in programmed construction, varying time horizons, mostly 1980 price levels	> 1,672	1,672	unknown

TABLE I - 1
(Continued)

Estimated Future Capital Requirements and Outlays,
State of Washington, 1983-2000
(millions of dollars, 1983 prices)

(1) Program Notes	(2) Capital Outlays Required to meet Estimated Needs, 1983-2000	(3) Estimated Capital Outlays 1983-2000	(4) Capital Needs Gap
6. Irrigation Districts			
Projected irrigated acreage expansion rates: Water Resources Council, 1.4% per acre (p/a); PNW River Basins Commission, 1.3 - 1.6% p/a; Agricultural Development Project, 1.4% p/a	≷ 200	200	unknown
7. Sewage and storm sewers			
EPA estimate of construction needs	6,977	2,621	4,356
Totals	$ 22,088	$ 12,321	$ 9,767

Needs estimates and planned expenditures reported by various agencies have been converted to 1983 price levels. Estimates of need from six-year capital spending programs have been extended to year 2000 based upon past relationships and anticipated expenditures for construction, or upon anticipated population growth and other variables. For highways, roads and streets includes effect of increased gasoline taxes approved by the legislature in May, 1983.

> Excess of needs over projected expenditures not known.

≷ Needs undefined; needs equated to estimated outlays.

2. Capital outlays for these seven elements of infrastructure are likely to total $12 billion (1983 dollars), if no policy changes take place. This projection of real expenditures is based on reports of anticipated revenues available for capital expenditure (adjusted to 1983 prices), and historical relationships. If these projections are valid, real capital outlays per year will show a continuation of the declining trend in real capital spending which prevailed from the mid-60's through the 1970's.

3. The existing infrastructure gap--the difference between investment needs and outlays--widens to an accumulated public capital shortage of nearly $10 billion for these seven elements of infrastructure. Unless policy changes take place, this may mean increasing maintenance costs to utilize available capital more intensively -- or diminishing service levels per capita.

Estimates of Need

The estimates of "need" which underlie the projected capital requirements are highly controversial. The needs of one person may be luxuries to another, and obviously the capital needs gap can be closed by redefining needs as well as by increasing capital outlays.

The premise that there are unfilled capital infrastructure needs must be related to certain goals or prescriptive standards. For many elements of the public infrastructure there are legislative mandates to be met. Federal law mandates that certain construction or performance standards be met, such as wastewater treatment, interstate highway design, ferry construction, and bridge replacement. State and local governments, too, impose design or performance standards for roads and streets, water supply, sewage, education, building construction and so forth.

In addition to statutory standards and codes, there are professional standards or guidelines of acceptable performance. Road conditions are

monitored by engineers, and health officers establish levels of sanitation to be achieved; these and other public officials make prescriptions of what is needed to meet their perception of generally accepted professional standards for health and safety.

Public perceptions of need are evident to administrators and legislators by citizen insistence that their wants be met: relief from a neighbor's failing septic tank, road improvements, better school buildings, the construction of public parks, facilities to assist their business endeavors, lower taxes, etc.

Social cost-benefit analysis would seem to provide a rational and objective basis for a needs assessment. According to this economic principle, efficiency in the allocation of scarce resources to satisfy competing wants is achieved at the margin where the additional cost of providing improved quantity or quality of service is just equal to the value of the additional benefits derived. However, cost-benefit analysis itself involves many implicit assumptions and subjective assessments which often lead to widely different appraisals of economic feasibility. Moreover, the conduct of a carefully-documented cost-benefit analysis can be a time-consuming and expensive process which is not cost-effective for every perceived need.

In the course of this study, many perceptions of need are encountered. Spokespersons for public agencies emphasize their concern about insufficient funding to meet their program objectives by the use of strong adjectives: basic needs, critical needs, essential needs, priority needs, urgent needs. Others, more skeptical, describe those needs as "wish lists", "budget posturing" or self-serving. The concept of need is indeed highly subjective.

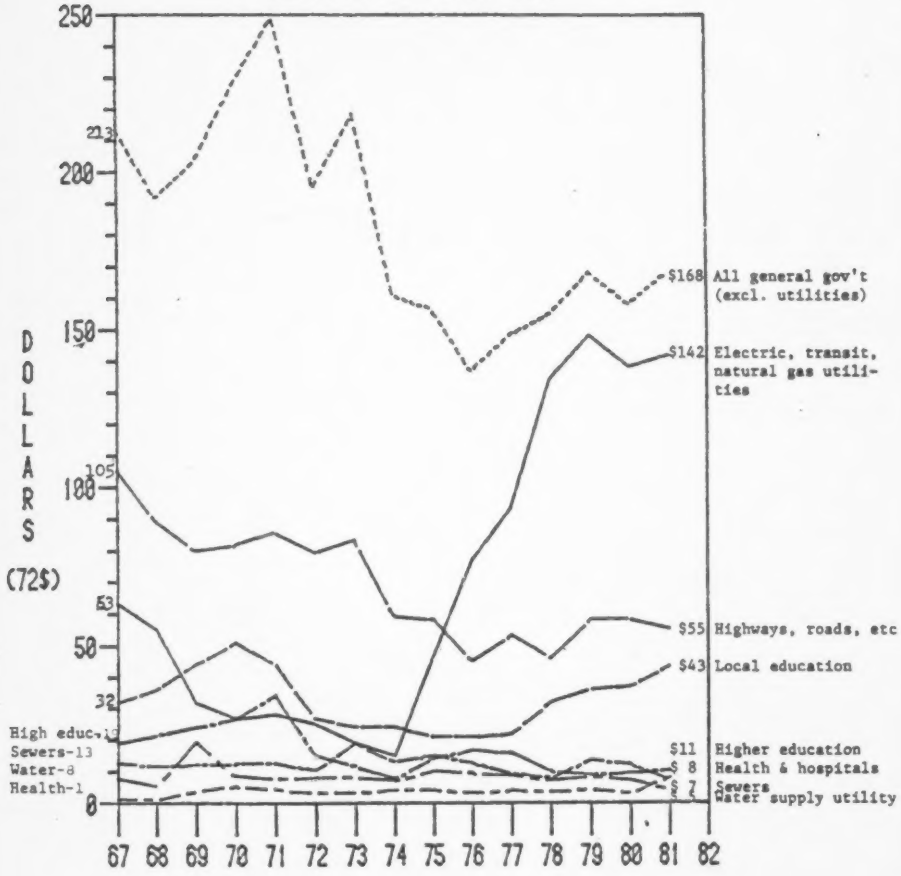
Recent Trends in Per Capita Capital Spending

Is there any other, more objective evidence that can be drawn upon to test the notion that a needs gap exists? In this section we examine the recent behavior of per capita expenditures for public capital. Chart I-1 provides a graphic picture of these trends. Real capital spending per resident in Washington State by all government agencies (i.e., state, county, city, and special districts), but excluding publicly owned utilities, has shown a generally declining trend over the fiscal years 1970-1971 through 1980-81, all dollars in 1972 price levels. This declining trend is especially noticeable for capital expenditures related to highways, streets, and roads (from $105 to $55 per capita), higher education (from $19 to $11 per capita), and sewage (from $13 to $7 per capita). Per capita expenditures for local education (K-12) show a complex pattern but, surprisingly, have been rising since the mid-1970's. Expenditures per capita for public health and hospital facilities have shown an irregularly rising trend and those for water supply have varied narrowly around an average of $9 (with a sharp decline to $5 in 1980-81).

These trends are clearly supportive of the notion that the investment in infrastructure in Washington State has been growing more slowly than population. History, then, seems to be on the side of the reports from agencies that capital investment needs are not being met, if needs for capital are related to the size of the population. Using pre-1973 standards, a continuous shortage of investment per capita in the years since is shown. Accumulated over time, this low rate of public investment is clearly consistent with the view of many government agencies that they are experiencing a capital shortage and, as population grows, the infrastructure gap will become wider unless rates of real public investment accelerate.

CHART I - 1

CAPITAL EXPENDITURES PER RESIDENT BY STATE AND LOCAL GOVERNMENTS WASHINGTON STATE, 1967-1981



SOURCE: GOVERNMENTAL FINANCES

Nominal expenditures deflated to $72 by implicit price deflator for state and local structures reported by U.S. Department of Commerce, and expressed per capita using OFM population estimates.

In sharp contrast to the declining per capita expenditures for most government functions has been the steeply rising per capita expenditures for government-owned electric utilities, public transit, and city natural gas utilities. This series is dominated by electric utilities, which in turn is dominated by the expenditures of Washington Public Power Supply System (WPPSS). Expenditures for this infrastructure segment rose from $15 per capita in 1973-74 to $142 in 1980-81 (in 1972 dollars).

Whether there is a connection between the steeply rising expenditures for government-owned electric utilities, transit, and natural gas, and the declines in the funding of other elements of infrastructure is beyond the scope of this study. In a broad sense all these changes might be related to rapidly rising energy prices, energy-induced recessions and their impact upon governmental finance, national policies to encourage energy independence, to control inflation, to foster private investment, and to reduce the presence of government.

Real Capital Spending Relative to Income

Another perspective of capital needs is provided by comparing real public capital spending relative to real personal income in Washington State. Over the interval 1965-1972, all general government real capital spending averaged 5% of real personal income and was never less than 4.8%. Since then, real capital outlay has averaged 3%, and has not been higher than 3.4% in any year. This distinctly lower ratio of real capital outlays to personal income also applies generally to the elements of infrastructure surveyed in this report as shown in Table I-2.

TABLE I-2

Relationship between Total General Government Capital Expenditures and Personal Income, State of Washington

	All General Government	Highways, Roads, Streets, Ferries, Water, Sewage
1965-72	5.0%	2.6%
1973-81	3.0	1.4
1983-2000[1]	Unknown	1.0

Source: Governmental Finances, deflated by National Income and Product Accounts deflator for state and local government structures, and real personal income reported by OFM.

[1] Projection for 1983-2000 is based upon projected outlays in Table I-1 and assumes a real personal growth rate of 2.9% per annum.

These observations provide another means of estimating future needs. Assuming conservatively that needs were met in the 1965-72 period,[1] and that needs vary in direct proportion to the growth of the economy, it is possible to project future capital needs on the basis of real personal income projections. How large would future capital outlays be over the 1983 - 2000 interval if 2.6% of future personal income were devoted to that purpose? It would require $31 billion of outlays (1983$)[2]. This total needs estimate is even larger than the $22 billion estimate shown in Table I-1.

The income relationship can also be used to project future capital outlays, assuming they remain at the recent rate of 1.4% of real personal income (no change from recent policy). Under these conditions the cumulative capital outlays would be $16.8 billion (1983$), also larger than the estimates based on an analysis of individual sectors. The implied infrastructure gap (the difference between needs and outlays) amounts to $14 billion, reinforcing the notion that there remains a huge funding gap--if needs as perceived by several criteria--are to be met.

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[1]There is evidence that perceived needs were larger than actual outlays even in this period. For example, see State of Washington Highway Systems Needs Programs Finances (a Report to the Joint Committee on Highways, December 1966) by Knoerle, Bender, Stone & Associates (Olympia).

[2]This estimate was arrived at as follows. Projections of the growth of real personal income in Washington State were taken from two reports: Inputs to Load Forecasting Models: Revised Growth Scenarios, by Charles River Associates (April 30, 1982) prepared for Pacific Northwest Power and Conservation Planning Council, and Bonneville Power Administration Forecasts of Electricity Consumption in the Pacific Northwest, Appendix I: Economic/Demographic Projections (May 1982). The baseline or medium projections of real personal income growth were 2.9% per annum. This growth rate was applied to projected real (83$) personal income in Washington of $53.3 billion estimated by OFM (Economic and Revenue Forecast, December 1982) to obtain total income over the 1983 - 2000 interval. Applying 2.6% for capital outlays over the period yields $31.1 billion for capital outlays.

The Interdependence of Needs

The needs for one element of infrastructure are not independent of the provision made for others. Elements of public infrastructure may be complementary or substitutable, to some degree. Expenditure requirements to maintain an ample supply of quality water are linked to the provisions made for adequate sewage facilities since insufficient control of liquid (and solid) wastes may contaminate sources of drinking water. Improvements in state highways, which encourage truck transport, place added demands upon county roads and city streets. Private sector provision of infrastructure, too, has an impact upon public infrastructure needs as exemplified by the rising volume of truck traffic upon roads as rail service to smaller communities has been reduced or terminated.

The fact that all public infrastructure is to some degree interdependent, and linked with privately provided infrastructure as well, makes the analysis of future needs for publicly provided infrastructure quite complex. We cannot address these complications in this study but wish to emphasize that the "infrastructure problem" cannot be resolved piecemeal. This means that the issues raised in this report must be dealt with at the policy level from a comprehensive perspective.

Conclusion

The development of this study has relied heavily on the continuing cooperation and dialogue with the directors and staff of many state agencies and local government associations. While these various groups may sit on opposite sides of other issues, their support of this project reflects their recognition of common capital problems and the intricate, sometimes intertangled nature of financing alternatives.

As a "threshold analysis", this report reveals perhaps more of what we do not know about the infrastructure of Washington State than what we do know. Yet, already it has served to stimulate the system to provide new information that was not available at the outset of the research. We hope that this is just the first step in an iterative process which will lead to a better and more consistent assessment of the current condition and future requirements of capital facilities throughout the state. Such information is a vital element of the state's effort to manage debt and to spur economic development.

While the gap between projected capital needs and outlays cannot be measured precisely, the magnitude projected by this study may be much smaller than what we would find if we could have systematically assessed every jurisdiction in the state. We surmise that many critical local public works problems currently fall through the net of various state capital needs lists. The current public works inventory effort undertaken by the Planning and Community Affairs Agency at the direction of the 1983 Legislature is likely to yield more useful information on local needs.

The quantification of the gap alone does not provide much insight about the consequences of unfilled needs. For instance, will community health and safety be threatened, will economic activity be curtailed, will jobs be eliminated, will operation and maintenance costs skyrocket, or will the level of various public services begin to erode if these needs are not met?

Nor does the gap reveal the professional or community standards, technology or policy objectives that underlie individual need estimates. One community's critical priority may be merely a chimera to another.

What we do know at this point is that we are spending less on the basic public facilities, relative to personal income and on a per capita basis, than we have at any point in the last 20 years and that many of these facilities are

either noticeably deteriorating or are no longer functioning to the level of public expectation. If this trend were to continue and the state's population were to grow, capital deterioration and declining service would become increasingly evident.

The gap is then meaningful to the extent that it forces us to evaluate carefully what we really need and why and, further, how much we are willing to spend. More capital may be necessary and defendable, but is not likely to be forthcoming to any extent that would relieve us from the difficult task of deciding priorities with limited resources. Our ability to define and to make strategic capital investment choices requires us to know where we are going and how we intend to get there. These choices will have a direct bearing on the quality of life so highly valued in Washington State.

II. HIGHWAYS, ROADS AND STREETS: AN OVERVIEW

In 1981 there were 85,000 miles of public roads, streets, and highways in Washington State. These ranged in type of surface from modern multi-lane highways and controlled access freeways which serve interstate and intercity traffic to rural roads leading to isolated farms, through remote forests, and into distant recreation areas. They also include county and city roads facilitating movement of truck transport and passenger vehicles to provide access to specific locations where people work, shop, or reside. These carriers of vehicles are essential to all types of business, farming, forestry, recreation, mail distribution, school systems, truck and bus transportation, and personal travel. About 70,000 miles of this road system are classified as rural, about 15,000 are urban.

Construction and maintenance of the surface transportation network are the responsibility of several political jurisdictions: the State of Washington manages 7,000 miles of state and interstate highways, 10,000 miles of streets are maintained by 265 cities, and nearly 42,000 miles of roads are the responsibility of 39 different counties. Other road surfaces are within national parks and forests, military sites, and Indian reservations.

Governmental agencies at all levels - state, county, and city - have responsibilities for planning, developing, operating, and financing the vehicular transportation system of Washington State. The Washington State Department of Transportation (DOT) is required by legislative mandate to develop a State Transportation Plan. This document provides a comprehensive statement of the anticipated needs for highways, and forecasts of revenue to finance them. The County Road Administration Board (CRAB) is a state agency of County Commissioners and County Engineers which monitors the activities of the 39

county road departments and reports on the conditions of roads. The Association of Washington Cities represents the interests of cities in a variety of activities including street needs and financing.

An overview of the costs of maintaining and improving the road system of Washington State by all levels of government is shown in Table II-1 and Chart II-1. During the past decade these expenditures have been increasing in dollar amounts from about $400 million per year at the beginning of the 1970's to in excess of $800 million in the early 1980's. However, inflation over the interval has more than doubled. Therefore, real expenditures are currently lower than a decade ago even while state population has grown, motor vehicle registrations have increased, and there has been an expansion of vehicular traffic. Measured in constant dollars (1972 purchasing power), total (capital plus operating and maintenance outlays) road expenditures per capita in Washington State have declined from about $140 in the early 1970's to about $94 in the early 1980's. Relative to real income in Washington State, expenditures have declined from 3.2% to 1.7%.

TABLE II - 1

Expenditures for Highways in Washington State by State, Counties, and Cities, in Nominal and Constant (1972) Dollars (millions)

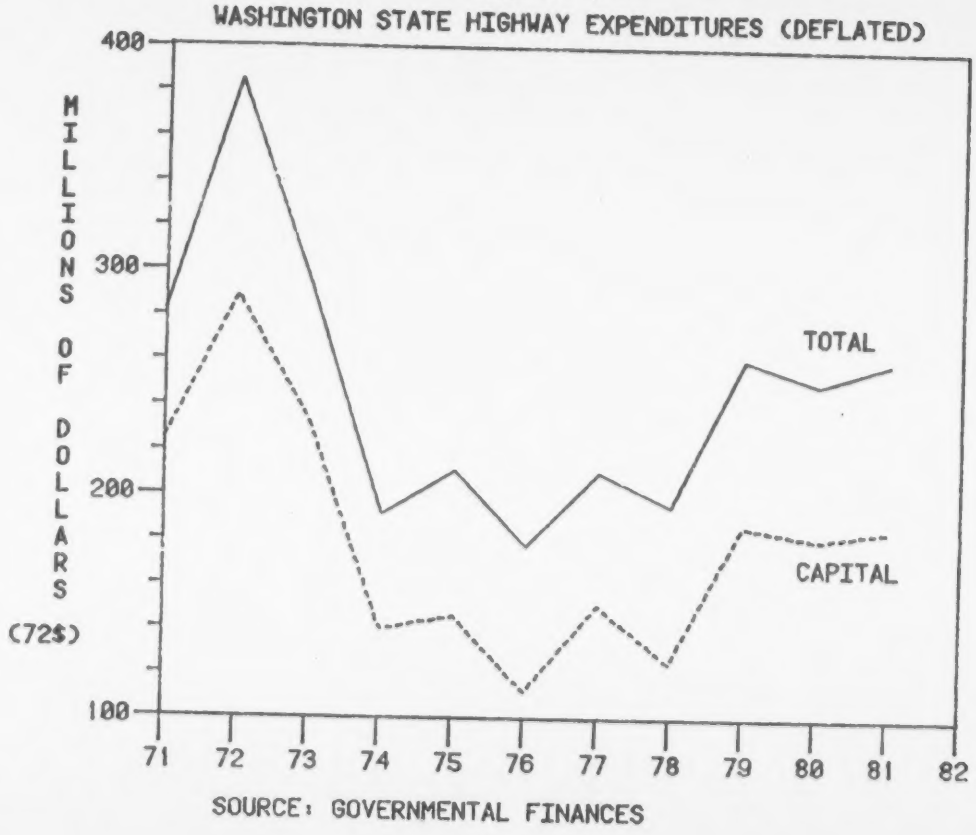
	Nominal $			Real (1972) $		
	Total	Capital	O & M	Total	Capital	O & M
1970-71	397	268	129	477	322	155
1971-72	406	264	142	449	293	156
1972-73	465	305	160	479	314	165
1973-74	410	245	165	349	236	113
1975-76	423	231	192	299	163	136
1976-77	502	290	212	340	196	144
1977-78	515	285	230	318	176	142
1978-79	711	425	286	385	230	155
1979-80	802	505	297	383	241	152
1980-81	894	525	369	396	233	163

Notes: Includes structures and maintenance, street lighting, snow and ice removal, bridge facilities, and ferries. Constant dollar estimates obtained by deflating the nominal expenditures by the GNP implicit price deflator for state and local government purchases of structures.

Source: Governmental Finances, Survey of Current Business

32-116 O - 84 - 5

CHART II - 1



III. STATE HIGHWAY NEEDS AND FINANCING

Present Condition

The 700 miles of Interstate and 6,300 miles of State Highways in Washington are maintained by the Department of Transportation (DOT), which manages a $10 billion dollar investment in state-owned transportation facilities (including highways, bridges, airfields and ferries). Maintenance of that investment and the safety, convenience and economical service it provides requires continued expenditures for upkeep. A DOT spokeperson says that the Washington State highway system is "one of the best in the country". Washington highways are described by DOT as well designed, better built, and well maintained compared to those in many other states.

Yet, of the 7,000 miles of state highways in the state system, only half are described as in good condition, while 1,200 miles of surface are classified as "poor" and in need of immediate resurfacing to preclude further damage requiring reconstruction (see Table III-1). According to DOT, well maintained highways require resurfacing an average of every 12 years (at an average cost of $125,000 per mile). While resurfacing can be postponed, the presence of road cracks, asphalt chunks, and potholes through which water penetrates the roadbed foundation, are evidence of advancing structural damage eventually requiring reconstruction at costs 3 to 5 times the cost of timely resurfacing.

There are 2,914 bridges on the state highway system, but 529 of these have been identified by the Federal Highway Administration as deteriorated or obsolete, and 200 of these will require replacement or rehabilitation over the next 12 years. Bridges allowed to deterioriate are eventually restricted in use.

TABLE III - 1

Qualitative Assessment of 4R* Needs on the
State Highway System

Miles of Highway on the State System

654	miles of Interstate	(Lane Miles:	3,136)
6,234	miles of non-Interstate	(Lane Miles:	13,656)
6,888			16,792

Estimate of Conditions - 1983

Interstate	Good	Fair	Poor
PSR	0-2.4	2.5-3.9	4.0-5.0
Mileage	360	215	79
Non-Interstate	**Good**	**Fair**	**Poor**
PSR	0-1.9	2.0-3.4	3.5-5.0
Mileage	3,710	1,370	1,154

PSR = Pavement Serviceability Rating

Good: Roadway meets current structural requirements, and does not need resurfacing now or in the near future.

Fair: Roadway is approaching the time when resurfacing will be required.

Poor: Roadway is in need of immediate resurfacing to preclude further damage. The number of miles exceeds the funds available. Therefore, the worst will be done first, and those which cannot be financed will be deferred increasing the probability that reconstruction will be required, at 3-5 times the cost of resurfacing.

Source: DOT, January 1983.

*The "4-R" Program is Reconstruction, Resurfacing, Restoration and Rehabilitation of highways.

State Highway Programs

In the Washington State Transportation Plan Update (1983-85), the DOT presents a long-range plan for state highway maintenance and construction based upon estimates of future need constrained by anticipated availablility of funds. That study, together with recent updates provided by the DOT, provides a basis for estimating the future needs and resources to finance the state highway system through the remainder of the present century.

The spending priorities for the DOT program are established by the state legislature. Work in progress has first priority on available construction revenues. Construction work is in priority by the following categories:

Category A: construction preservation of existing state highways. This is the "4-R" program of reconstruction, resurfacing, restoration and rehabilitation of highways.

Category B: the completion and preservation of Interstate highways. This federally-funded program requires 10% state matching.

Category C: new construction to expand the capacity of the state highway system (100% state funded).

Needs and Funding, 1983-89

According to DOT, the funding required to achieve the constrained program objectives of the agency over the next six years amounts to $3,174 million. These needs, which include the maintenance and recommended construction program of the agency, are shown in Table III-2. However, DOT claims that a total of two billion dollars of Category C projects have been specifically indentified as needed over the next twelve years. However, only $477 million of these needs show up in the recommended program since it is not practically feasible to

obtain funding for all needed Category C projects. This is the meaning of DOT's constrained budget program. We have included one-half of the identified Category C needs as part of total construction needs in the period 1983-89. These are distributed evenly over the six year planning period, offset in each biennia by the Category C expenditures actually included in the recommended program. These are shown in Table III-2 as Category C* needs. Including these, a fully funded program would involve outlays of $3,696 million.

Total funding available to meet state highway needs over the next six years is estimated to be $2,927 million by DOT. All maintenance needs are met, and anticipated revenues are adequate to meet Category A and Category B construction needs. Only a portion of Category C needs are met. Unmet needs, as perceived by DOT, amount to $769 million. Chart III-1 shows the relationship between the estimated requirements for a fully funded state highway program and the anticipated sources of funds available to meet these needs over the period 1983-89.

The above projections incorporate an allowance for inflation at an annual rate of 7% for maintenance costs and 9% for construction costs. Adjusted to 1983 price levels, the real capital needs are $2,364, real capital outlays are $1,806, and the real capital needs gap is $558 million over the 1983-89 planning period.

Needs and Funding, 1989-2000

Projections of needs and expenditures beyond the six year planning period of DOT are even more speculative. DOT has estimated that nominal outlays may be $7,832 million (maintenance $1,078 million, capital $5,994 million). This projection assumes inflation rates of 7% and 6% for capital construction and maintenance, respectively. The projection also assumes the Interstate highway program will be completed in the 1990-92 period but some federal funding to

TABLE III-2

State Highway Financing: Needs and Funding

Six Year Program

(millions of dollars)

Part I: Needs

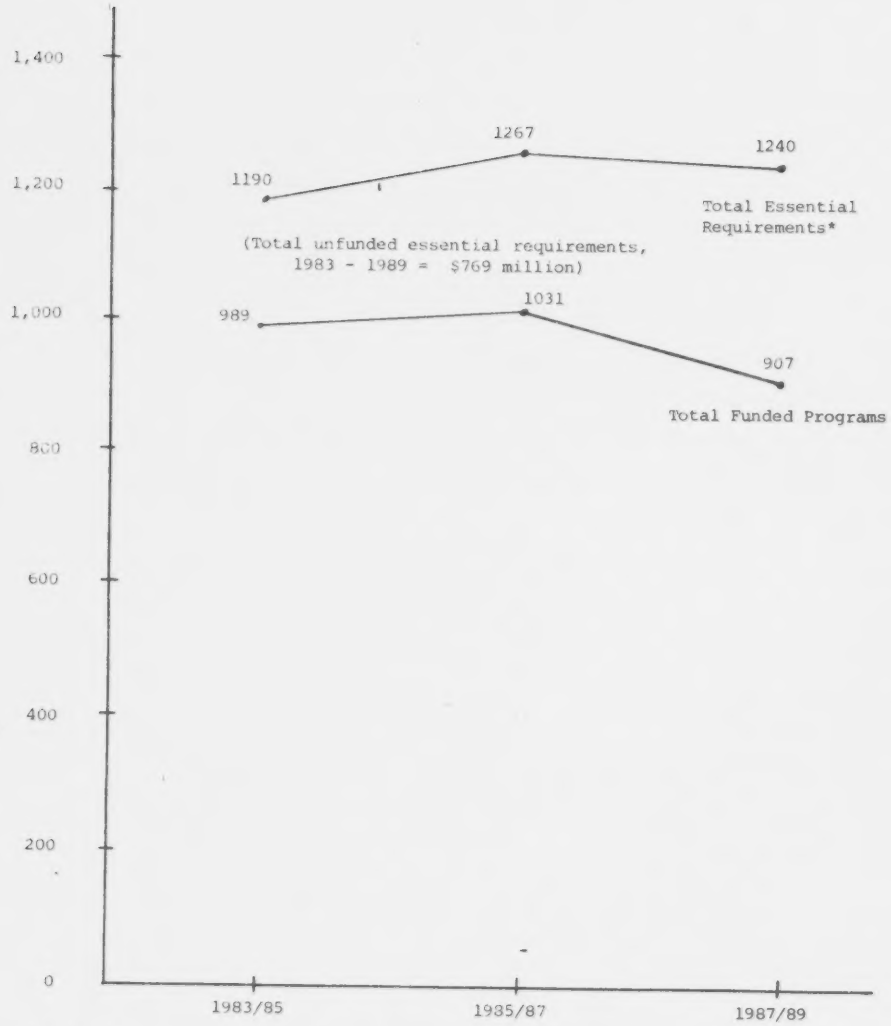
	Maintenance	Construction					Total, maintenance & construction
		Recommended Program -----Category------			Additional needs	Total	
		A	B	C	C*		
1983-85	$ 157	225	475	133	200	1,033	1,190
1985-87	175	248	511	160	173	1,092	1,267
1987-89	197	230	480	184	149	1,043	1,240
						Total	3,697
Part II: Available funding							
1983-85	156	225	475	133	0	833	989
1985-87	175	248	511	97	0	856	1,031
1987-89	197	230	480	0	0	710	907
						Total	2,927

Note: Category C*, an estimate of Category C needs not included in DOT constrained program recommendation (see text).

Sources: Information Summary, Motor Vehicle Fuel Tax Increase Legislation (March 22, 1983), and DOT data sheets (updated May 27, 1983).

CHART III - 1

WASHINGTON STATE HIGHWAYS
Comparison of Essential Requirements
and Funded Programs



* Includes an assumed even distribution of $2,000 billion of Category C needs over a 12 year period.

preserve the system will be forthcoming. Given the difficulty of making projections for distant horizons, these outlay estimates are much less precise than the cardinal numbers imply.

Other than a carry-over of $1 billion of currently identified Category C needs, no estimates of future needs for the 1989-2000 time interval are available. We have assumed that new capital needs will expand in proportion to the expected state population growth rate of 1.1% per annum for the period after 1989, using the 1988-89 capital needs as a point of departure. Accumulating the real capital needs over the interval 1989-2000 leads to a capital needs estimate of $4,808 million (in 1983 price levels). Estimated capital outlays, similarly deflated to 1983 price levels, amount to $2,766 million. These estimates imply a capital needs gap of $2,042 million.

Summarizing over the 1983-2000 period, the perceived capital needs amount to $7,172 million, anticipated real capital outlays are $4,572 million, and the captial needs gap is $2,600 million.

Sources of Funding

Funding for state highways comes from a variety of sources. These sources are:

1. Federal-Aid Highway funds from the Federal Highway Trust Fund. The primary revenue source which feeds this fund is the federal motor vehicle fuel tax (9¢ per gallon effective April 1, 1983).

2. State funds from the Motor Vehicle Fund. The revenue sources which feed this fund are 52.21% of the revenues available for distribution from the state motor fuel tax, plus a portion of the motor vehicle registration fees, gross weight fees on trucks, and miscellaneous fees.

3. Local funds: These represent reimbursements by other government agencies to the DOT for state-assisted highway construction and maintenance on local roads.

4. Bond funds.

The recent sources of revenue for highway construction and maintenance, and projections of future revenue sources as estimated by DOT, are shown in Table III-3. The most important source of funding for highway construction has been Federal aid, and the principle Federal aid program has been the Interstate highway program, followed by state funds, bond funds, and local reimbursements.

Projections of revenue sources beyond the 1987-89 biennium are highly speculative. The interstate highway program is expected to be almost completed in the 1990-92 time period, although it is probable that some funding will be provided to maintain the interstate highways. Orders of magnitude of total revenue have been calculated by DOT; they emphasize these are not precise projections.

TABLE III - 3

Sources of Funding for State Highways

(Including Interstate)

(millions of dollars)

	Actual			Projected				
	1977/79	1979/81	1981/83	1983/85	1985/87	1987/89	1989/95	1995/00
Federal	267	414	394	535	582	559	Unknown	
State	259	285	267	213	319	300	Unknown	
Bond	-	5	83	146	126	48	Unknown	
Local	5	7	9	18	4	-	Unknown	
Totals	531	711	753	912	1031	907	3,156	4,676

Source: DOT, May, 1983. Reflects most recent projections of Federal and state revenues through 1989.

IV. COUNTY ROADS AND CITY STREETS

Trends in Expenditures

Like state highways, nominal expenditures for city streets and county roads have more than doubled during the past decade. But rapidly rising expenditures have been offset by rapidly rising prices of labor and materials. Therefore, real expenditures for county roads and city streets at the end of the decade were somewhat less than at the beginning. Taking into account population growth, per capita real expenditures have actually declined from about $50 per resident to less than $40 (measured in dollars of 1972 purchasing power). As shown in Table IV-1 or Chart IV-1, real capital outlays exhibit a slightly higher proportion of total spending over the course of the past decade.

Existing Conditions

At the present time there are 42,137 miles of county roads (25,305 miles paved) and 10,182 miles of city streets (8,610 paved). According to spokespersons for counties and cities, street and road conditions are not good.

The Association of Washington Cities says that, like cities in the rest of the country, there are signs of unfilled need to maintain the infrastructure. In Seattle, for example, it is reported that record numbers of motorists are filing damage claims against the city after their cars hit potholes. The head of the city's Roadway Maintenance Division puts it concisely, "streets are in worse shape because there are fewer workers and less money to repair them".[1]

This theme is echoed by the Director of the County Road Administration Board (CRAB) who predicts serious deterioration of the county road system within four or five years. A member of the Board sums up the situation: "Each year we

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[1] Seattle Post-Intelligencer, December 19, 1982.

TABLE IV - 1

State of Washington

Combined County and City Road/Street Expenditures

1970 - 80

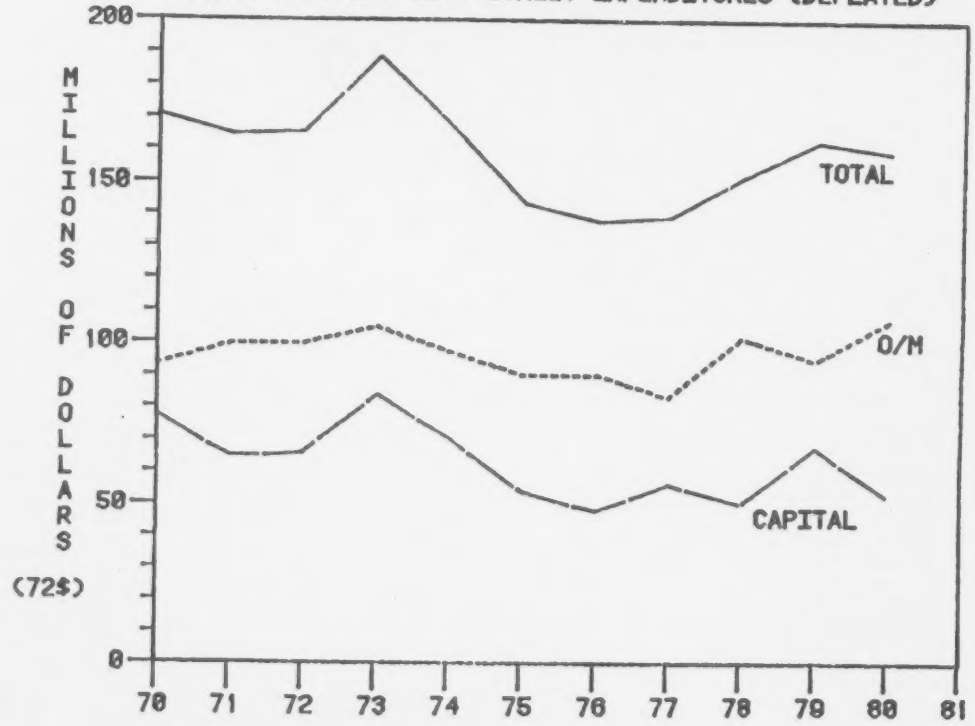
(in millions of dollars)

	Nominal Expenditures			Real Expenditures ($'72)		
Year	Total	Capital	O/M	Total	Capital	O/M
1970	92.0	64.4	27.6	170.5	77.3	93.2
1971	148.6	58.6	90.0	164.4	64.8	99.6
1972	160.4	63.6	96.8	165.4	65.6	99.8
1973	195.5	86.8	108.7	188.6	83.7	104.9
1974	196.5	82.3	114.2	166.9	69.9	97.0
1975	192.1	71.7	120.4	143.4	53.5	89.9
1976	195.4	67.6	127.8	137.8	47.7	90.1
1977	209.8	86.6	123.2	139.3	55.9	83.4
1978	245.2	80.5	164.7	151.5	49.8	101.7
1979	300.1	125.1	175.0	162.6	67.8	94.8
1980	332.2	108.5	223.7	159.3	51.9	107.4

Source: Governmental Finances, deflated by National Income and Product Accounts price deflator for state and local structures.

CHART IV - 1

WASHINGTON STATE
COUNTY ROAD AND CITY STREET EXPENDITURES (DEFLATED)



SOURCE: GOVERNMENTAL FINANCES

keep losing ground. It's getting to the point now that for many counties the situation is critical".[1] Population growth and rising traffic volumes put increasing demands upon the road system but the flow of available dollars has been substantially devalued by inflation. For the first time since World War II, according to CRAB, county roads are deteriorating.

The reports of worsening conditions of roads and streets has its complement in the disrepair of bridges. There are more than 4,000 bridges under county-city jurisdiction, but bridge inspections have prompted the Federal Highway Administration to consider 30% of them as deficient (see Table IV-2). Estimates by the DOT State Aid Division are that the 1982 replacement cost of these structurally or functionally deficient bridges was $587 million and will rise to $640 million in the next biennium.

It is not only the growth of population and increased vehicular traffic which strain the road system, but changes in the entire transport system of the country have increased the road burden. In the wake of the deregulation of railroads, for example, rail service to many smaller communities and the industries upon which they depend has been interrupted; thus, short-haul traffic is increasingly dependent upon trucks of larger size and weight using roadbeds not designed for behemoth vehicles.[2]

Another example of change is mass transit. A greater number of larger buses means that heavier loads are imposed upon roadbeds. Moreover, road

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1 County Road Report, 1981, p.4

2 Dr. Kenneth Casavant, a Washington State University agricultural economist, says that the crumbling transportation system is approaching crisis proportions, especially as changes have taken place in the way grain and other commodities are moved. Seattle Times, February 25, 1983.

TABLE IV - 2

COUNTY AND CITY DEFICIENT BRIDGE SUMMARY - FHWA CRITERIA

Total number of local agency bridges in Washington State:	4351	(100.0%)
Number of local agency bridges FHWA considers deficient:	1326	(30.5%)
(a) Number FHWA currently classifies structurally deficient:	533	(12.3%)
(b) Number FHWA currently classifies functionally obsolete:	793	(18.2%)
(c) Estimated 1983-85 replacement cost of deficient bridges:	$ 640.4 million	

Notes:

(1) Structurally deficient: Impeding the flow of goods and services because of inadequacy to carry the loads desiring to use the bridge on a day to day basis. Structural deficiency may be due to inadequate design (bridges built in the early 1900's, when vehicles and loads were smaller), or deterioration of or damage to the bridge members.

(2) Functionally obsolete: Impeding the flow of goods and services primarily because of geometric inadequacies. Examples are bridges with inadequate vertical clearance for legal vehicles, bridges which are on poor alignment to the approach roadway, bridges which are too narrow for oncoming traffic to pass freely, and bridges with too few lanes for existing traffic counts.

Source: Summary of County and City Bridge Replacement Needs, prepared by WSDOT State Aid, May 26, 1982.

improvements to streets are essential if buses are to reach residential collection points. Still another dynamic creating a need for more road construction, reconstruction, and maintenance has been the decentralization of manufacturing activity. As industry increasingly locates in new industrial parks outside the old urban industrial core, new patterns of passenger and truck traffic are established which necessitate new or improved roads and streets.

Definition of Needs and Resources

The County Road Administration Board and the Association of Washington Cities each prepare estimates of needs and anticipated revenues in support of their six-year planning programs for roads and streets.

The needs projections consist of two major elements: the estimated cost of maintaining the existing system at a level necessary for safe travel commensurate with traffic volumes, and the estimated cost of improvements that will provide an adequate system to handle expected traffic according to accepted safety practices and capacity analysis. The studies assume no system expansion. Traffic volume, accident history, claims reports and surveys of pavement conditions are objective criteria, but these needs estimates, in the final analysis, are based upon subjective judgments made by engineers.

A definition of "essential needs" is provided in instructions to county road engineers:

> Essential needs for your county should include the work covered by your customary Six-Year Program and go beyond that to include additional work that is needed to bring your system to an adequate condition. This additional work cannot be specifically defined in a way applicable to all counties. Each County Engineer must evaluate the existing condition of his County's system and list the work that is essential to bring the system to an adequate service condition. What is essential will vary because all counties are not in the same condition of adequacy. Paving your entire system with plant mix may be a goal to be envied, but it is hard to justify as essential for

> adequacy. On the other hand, a road that is breaking up under heavy traffic can justifiably be listed as an essential need for reballasting (p. 1, General Information for Six-Year Construction Program).
>
> An interpretation, in a "Memo of Understanding", further explains:
>
> "...Six-Year "Needs" would be a listing of those projects which have been determined necessary for the given or projected traffic volumes, road service or ballast conditions, pavement width, etc., regardless of whether funds are available or not." (Robert Turner, Spokane County Engineer to William Thorton, Chairman, WSACE Finance and Resources Committee, January 6, 1982).

The County road revenue projections are developed by each county engineer using motor fuel tax revenue estimates from DOT, federal highway program revenue estimates developed by CRAB, Forest Reserve Fund estimates supplied by the United States Forest Service, State Timber Harvest Tax Revenue estimates furnished by the State Department of Revenue and city revenue estimates are developed by the Association of Washington Cities.

Needs and Revenues, 1983-89

The estimates of essential requirements and anticipated revenues for county roads and city streets are shown in Charts IV-2 and IV-3. The total essential requirements of counties over the next six years are twice as great as anticipated revenues. Those for cities are 77% more than anticipated revenues. The six year shortfall for counties is $1,581 million, while the gap for cities is $866.5 million. These estimates are in nominal dollars with allowance for anticipated rates of inflation (9% for construction and 7% for maintenance).

In real terms (1983 price levels), the total needs for counties over the six year planning period are $2,580 million, while real revenues to finance them are estimated to be $1,266 million. According the CRAB Six Year Essential Requirements Study (November 1982), counties completely lacked funding for $1,153 million (1983 prices) of needed capital improvements. The creation of the Rural Arterial Program by the Legislature (funded from fuel tax increases

CHART IV - 2

COMPARISON OF ESSENTIAL ROAD REQUIREMENTS AND PROJECTED REVENUES

All Counties: 1983-88
(millions of dollars)

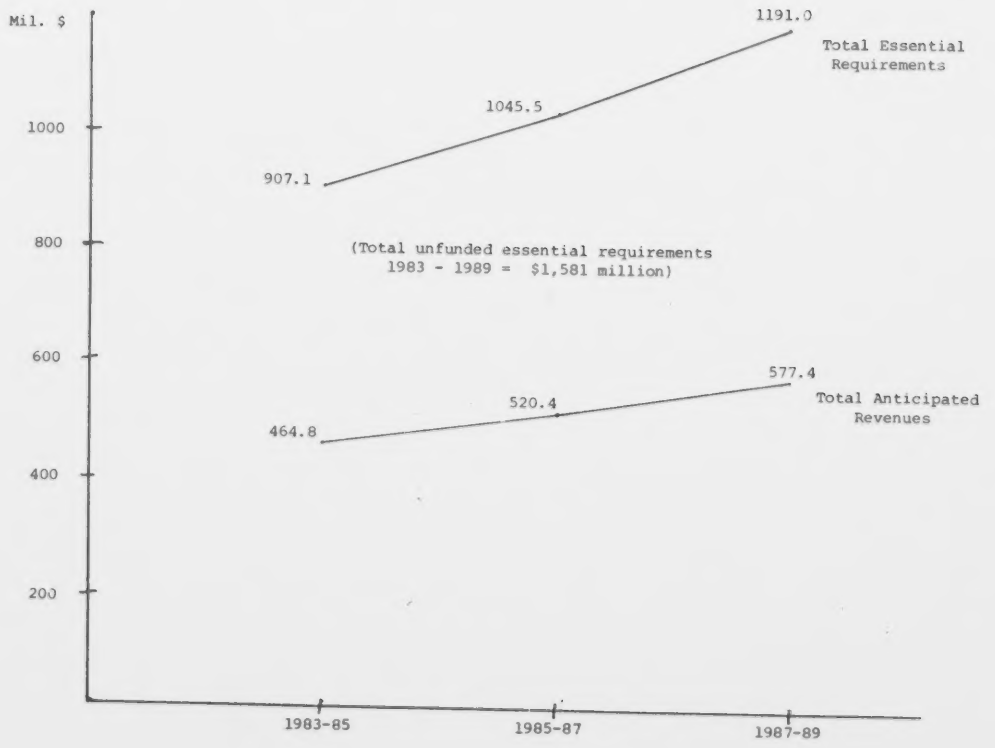
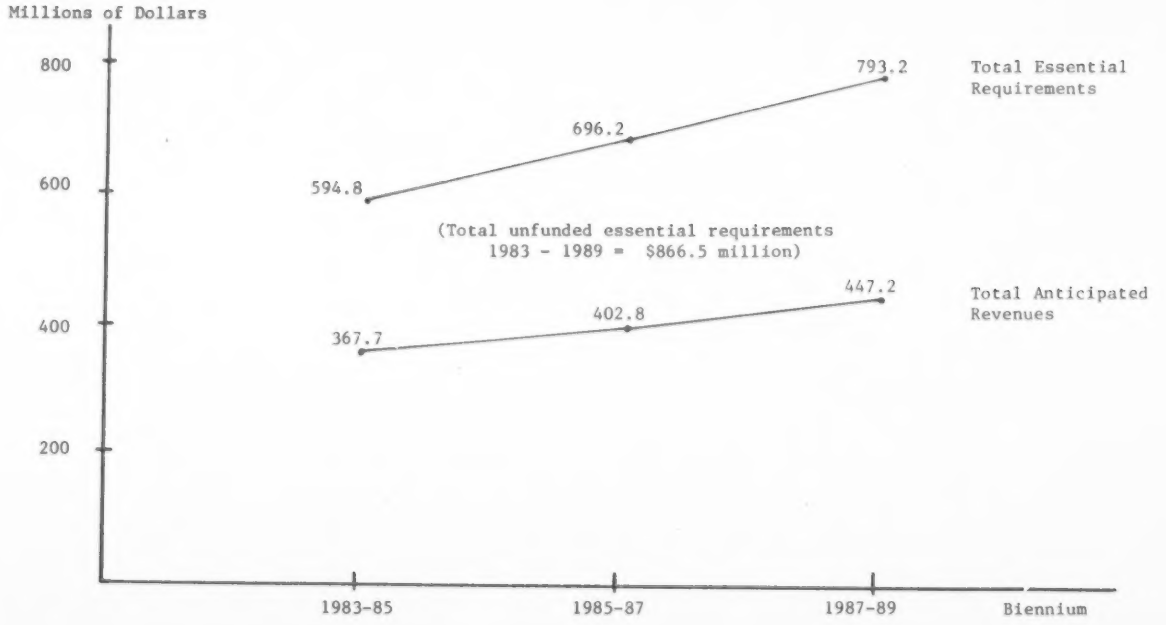


CHART IV - 3

Comparison of Essential Street Requirements
and Projected Revenues

All Cities: 1983-88
(millions of dollars)



commencing July 1, 1983) makes available capital funding dedicated to the reconstruction and preservation of farm-to-market and other high priority rural roads; this source will provide an estimated $37 million (1983 price levels) of capital funds for rural roads over the period 1983-88.

For city streets, the essential requirements in this six year planning interval amount to $1,709 (in 1983 prices) and the real revenues are anticipated to be substantially less than these needs. The deflated capital needs are about $1,008 million while real revenues available to finance capital needs are $319 million. This implies a capital needs gap for cities of $689 million in the 1983-88 interval.

Needs and Revenues, 1983 - 2000

Total essential requirements for counties and cities after 1988 were projected on the basis of anticipated population growth (1.0% for counties, 1.2% for cities). These total requirements, accumulated over the 1988-2000 interval, amount to $5,193 million for counties and $3,504 million for cities (1983 price levels). Historically, capital expenditures of counties have been about 40% of total outlays, while those of cities about 50%. These ratios were applied to obtain estimates of real capital spending over the 1988-2000 interval (counties, $2,077 million; cities, $1,752 million). Combining these with the real capital needs from the six year spending programs leads to an estimate of real capital needs for counties of $3,230 million and for cities of $2,760 million for the 1983-2000 period.

No revenue anticipation data for the 1988-2000 interval are available. However, we do know the needs/revenues ratio of counties (2.0) and cities (1.7) for the 1983-88 interval and that these ratios are generally consistent with prior studies. These ratios were used to indirectly estimate ("back out") an estimate of real revenues available to meet real capital needs for the period

1983-2000. For counties this estimate is $1,507 million, for cities $1,614 million. On this basis the real capital gap for counties is $1,623, for cities $1,146, over the period 1983-2000. While these estimates are circuitious and involve assumptions which are not fully tested, they provide a first-cut toward measuring long-term needs and funding prospects.

Sources of Funding

The principal sources of revenue for funding county and city road and street programs are shown in Table IV-3. The principal sources of funding for both county roads and city streets have traditionally been county road assessments and city appropriations derived substantially from property taxes. In Washington State, portions of the state motor fuel tax fund are distributed to counties (22.78%) and cities (11.53%) according to statutory allocation. This tax represents the second most important source for funding local roads and streets. In recent years Federal Highway Administration funding has played an important role, along with funding through the issuance of bonds, miscellaneous receipts, state grants, parking meter fees, and interest income.

Projections of funding sources beyond the six-year planning period are not made because of uncertainties related to both federal and state policies, as well as the availability of locally-generated funding sources. In a previous section, estimates were made concerning the overall availability of revenues to support the same level of per capita road services to the year 2000. Attempts to refine the specific sources of revenue would require unwarranted presumptions concerning policy choices yet to be made.

TABLE IV - 3

Anticipated Revenues, Counties and Cities, 1983-88
(millions of dollars)

County Revenues	1983-85	1985-86	1987-88
Local road levy	194.6	227.0	265.0
State fuel tax	157.5	173.3	178.3
Rural arterial program	13.0	13.0	14.0
Timber harvest tax	10.6	13.3	15.5
FHWA programs	40.0	40.8	44.7
Federal forest reserve	26.2	34.1	39.8
Miscellaneous	22.9	18.9	20.1
Total county	464.8	520.4	577.4
City Revenues			
City funds	170.9	195.6	224.1
State fuel tax	69.4	69.4	69.4
FHWA programs	16.2	16.2	16.2
Miscellaneous state and federal	69.4	73.6	78.5
Bond sales	41.8	48.0	59.0
Total cities	367.7	402.8	447.2

Source: Counties: Six-Year Essential Requirements Study 1983-88, CRAB (November 1982), and revisions reported by Ernest Geissler, 4/23/83, 5/13/83.

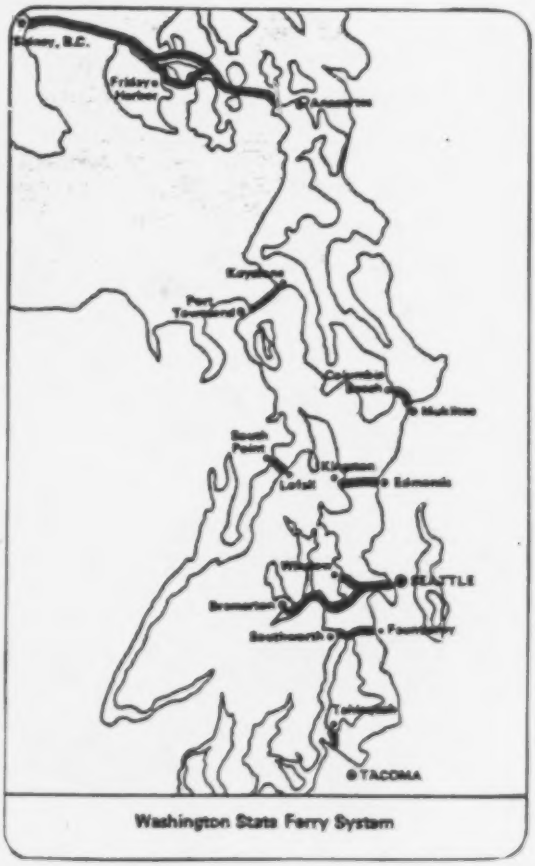
Cities: An Overview of City Streets, AWC, August 7, 1982, and revisions reported by Stan Finkelstein, 4/26/83.

V. THE WASHINGTON STATE FERRY SYSTEM

The Washington State Ferry System is the largest marine highway system in the United States. The system is composed of 22 ferry vessels and terminal facilities. It operates over 88 nautical miles of water to link Washington State highways, and serves eight counties in the state (see Chart V-1). In 1982 it transported 7.6 million motor vehicles and 10.7 million passengers. The Washington State Ferry System is operated as a division of the Washington State Department of Transportation. Operating statistics of the Ferry System are inclusive of the Hood Canal Toll Bridge and the various terminal facilities.

There are also five county ferry systems in Washington State; combined, these operated six ferries and in 1980 carried 272,000 vehicles plus drivers and 531,000 passengers.

Chart V - 1



Washington State Ferry System

Recent Expenditures and Projected Needs

Recent expenditures and programmed outlays for the Washington State Ferry System are shown in Table V-1 and in Chart V-2. Although these data omit the operations of county ferries, their inclusion would augment these estimates by only one to two percent.

The gap between the revenue anticipated to support the operating and construction costs of the Washington State Ferry System, and the revenue needed to maintain the system over the next three biennia has been estimated by the Department of Transportation as approximately $61 million, assuming an inflation rate of about 6½%. Expressed in constant 1983 dollars, the prospective unfunded gap over the planning period is approximately $42 billion. This gap represents the funding shortfall in the Ferry System capital programs. Real capital needs have been estimated as $77 billion, but only $35 billion is expected to be available to meet them.

Sources of Funding

State Ferry System financing depends upon user charges, a portion of the state motor vehicle excise tax, a portion of the state motor fuel tax, a portion of the vehicle registration fees, authority to sell bonds, and urban mass transit funds (limited to passenger related activities). These sources of revenues and their allocation between O/M and construction accounts are shown in Chart V-3.

In 1982, tolls and fares provided only 61% of revenues needed for operations, with tax sources providing the remaining. All capital construction is financed from sources other than fares. DOT estimates that ferry system traffic will increase about 3% annually and plans to adjust fares to the growth of the Seattle Consumer's Price Index (if ferry workers wage increases are the same as that for other state employees). However, the diversity of sources for future

funding and the unpredictablity of future public policies make projections of the relative importance of sources to the revenue projections for the year 2000 impossible.

TABLE V - 1

Actual and Programmed Ferry System Expenditures
(millions of dollars)

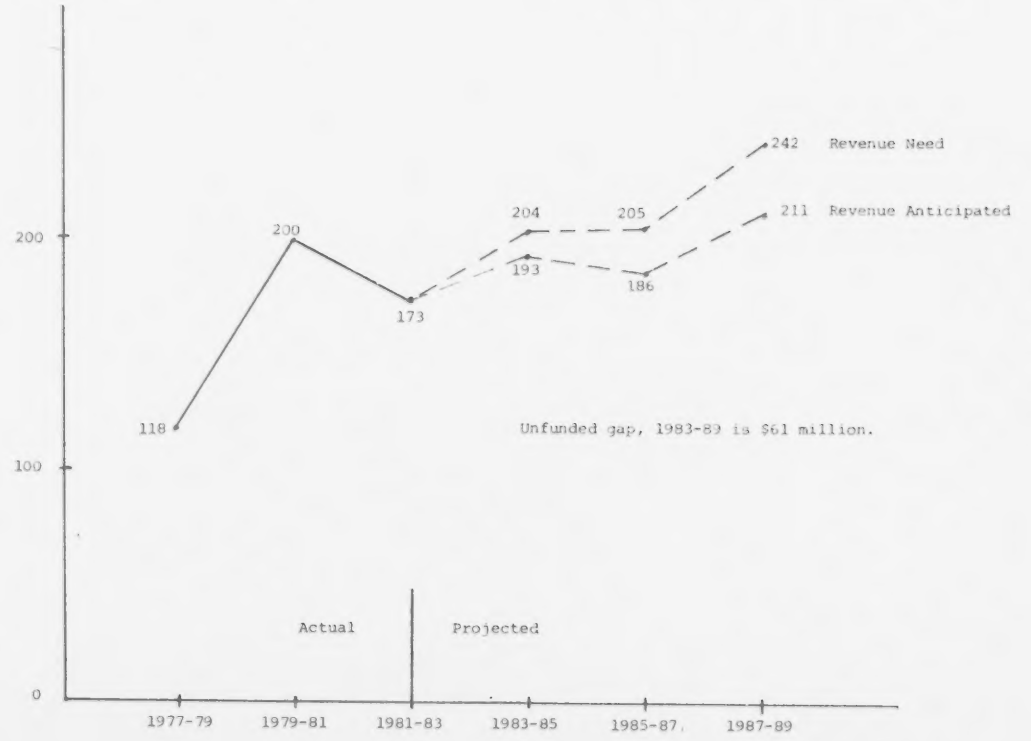
Biennia	Nominal Expenditures			Real Expenditures ($83)		
Actual	Capital	O/M	Total	Capital	O/M	Total
1977-79	39	79	118	55	104	159
1979-81	78	122	200	93	140	233
1981-83	38	135	173	39	135	174
Projected						
1983-85	27	166	193	24	141	165
1985-87	8	178	186	6	140	146
1987-89	8	203	211	5	140	145
1989-95	-	732	732	-	456	456
1995-2000	-	1,037	1,037	-	456	456

Source: Department of Transportation, May 1983.

CHART V - 2

WASHINGTON STATE FERRY SYSTEM,

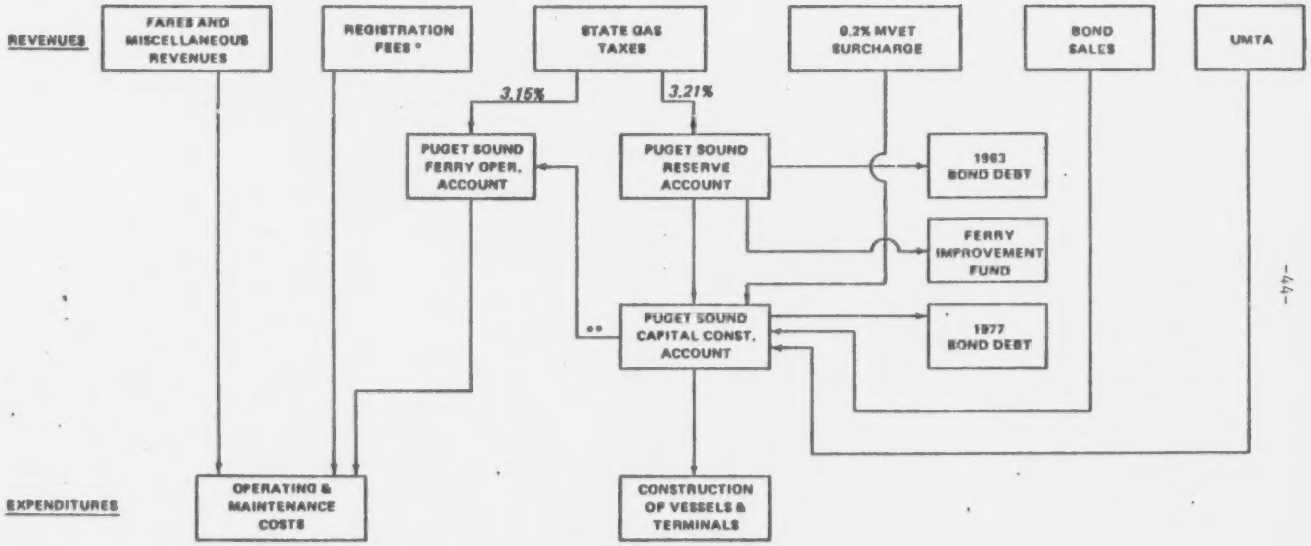
REVENUE AND NEEDS FORCAST
(millions of dollars)



Unfunded gap, 1983-89 is $61 million.

CHART V - 3

WASHINGTON STATE FERRY SYSTEM FINANCING



* *27.37% of $7.40 of new cars and $3.40 of old car registration fee.*

** *Receipts from Bond Sales and UMTA cannot be transferred as tax support for operations.*

VI. PUBLIC WATER SUPPLY

Drinking water is currently supplied to 90% of Washington State's 4.3 million residents by approximately 8,100 public water systems. Water systems consist of three major components: source/treatment, storage, and transmission/distribution. A source of water can be either from surface water or ground water and includes facilities and projects related to well site or surface water development and watershed protection. Treatment encompasses plant facilities for processes such as disinfection by chemical additions, flocculation, filtration and softening. Storage is defined as reserviors or holding tanks and includes projects involved with resevoir site acquisition and construction of impoundments, ground level resevoirs, stand pipes and elevated tanks. Transmission/distribution is the complex mechanical system of booster pump stations, pipes, valves, meters, and hydrants that delivers drinking water to consumers.

Public water systems provide services to residences, commercial and industrial users for drinking, cooling, process uses, cleaning, maintenance of pools and fountains, and firefighting. Water can be provided on a wholesale or retail basis and ownership of the facilities varies. In Washington, water is supplied by cities, counties, water districts and private companies. Table VI-1 illustrates the relative proportion of service provided by each category of suppliers in terms of revenue generated.

Regardless of supplier, all but the very smallest public water systems are regulated under the guidelines of the Federal Safe Drinking Water Act and are monitored by the Department of Social and Health Services (DSHS), the Department of Ecology (DOE), or local health districts.

Table VI - 1

Revenues Generated by Suppliers of Water, 1980

Type of Supplier	Revenues	Percent of Total
Cities	$ 87,377,899	67%
Water Districts	38,500,583	30
Private Companies	3,630,527	3
Counties	21,518	1
TOTAL	$129,530,527	100%

Expenditure Patterns

Operating and maintenance costs for Washington State water districts for the period 1970 to 1980 have risen from $37.3 million to $47.8 million in 1972 dollars, an increase of 28%. Capital outlay costs range from $27.9 million in 1970 to $20.4 million in 1980, peaking at $36.4 million in 1974 (see Table VI-2 and Chart VI-1).

Goals of Water Planning

Washington State is fortunate to have generally good quality drinking water. However, occasional summer shortages illustrate a need to avoid overconfidence in the public water systems. While the spread of serious waterborne disease has decreased markedly in recent years, the potential for contamination still remains and is the basis for the strict water quality standards enforced by DSHS. The goal of the Washington State safe drinking water program is to protect the public from such disease and toxic substances, to assure the public of reliable water service by assistance and control of public water systems, and to secure compliance with departmental and State Board of Health regulations and the Federal Safe Drinking Water Act. The Federal Safe Drinking Water Act has established national quality standards which are enforced by DSHS for all the larger public systems and by local health departments for smaller services. The Water Supply and Waste Section of DSHS is charged with protection of drinking water supplies through administration of State Board of Health regulations.

The strategy to accomplish quality enforcement is to assure adequate facilities by promotion of needed projects, providing technical assistance regarding improvements, and funding of projects. Other aspects of this strategy are a mandatory certification program, and a monitoring and surveillance program providing bacteriological and chemical analysis reports, review of operating reports and sanitary surveys.

Table VI - 2

Local Government Operated Water Supply Systems
Washington State
1970-1980 (millions of dollars)

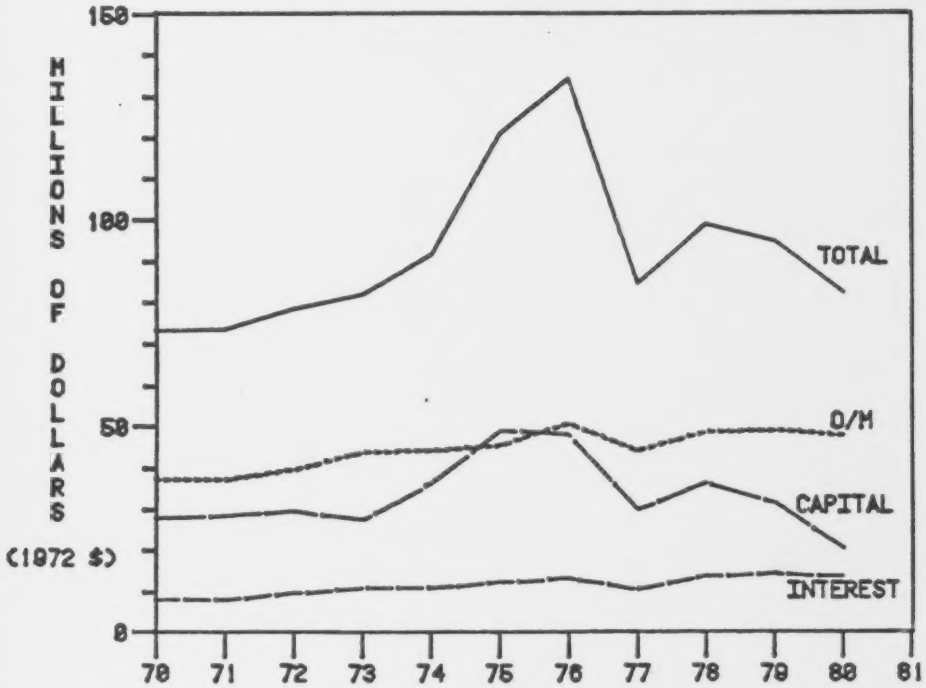
	Nominal Expenditures				Real Expenditures (72$)			
Year	Total	O/M	Outlay	Interest	Total	O/M	Outlay	Interest
1970	64.5	33.0	24.2	7.3	73.1	37.3	27.9	7.9
1971	69.2	34.8	26.8	7.6	73.3	37.0	28.4	7.9
1972	78.4	39.5	29.4	9.5	78.4	39.5	29.4	9.5
1973	87.5	46.6	29.4	11.5	81.9	43.6	27.4	10.9
1974	110.2	50.9	46.6	12.7	91.6	44.3	36.4	10.9
1975	120.8	56.8	48.7	15.3	92.3	45.3	34.8	12.2
1976	134.1	69.1	47.9	17.1	97.2	50.8	33.4	13.0
1977	124.5	64.7	45.3	14.5	84.4	44.2	29.8	10.4
1978	158.9	76.0	62.5	20.4	98.7	48.6	36.4	13.7
1979	167.6	82.4	62.2	23.0	94.7	49.0	31.5	14.2
1980	157.5	87.7	45.2	24.6	82.0	47.8	20.5	13.7

NOTE: Services deflator used for O/M costs/Structures deflater used for capital outlay/Personal consumption deflator used for interest

SOURCE: Governmental Finance (1970-1980)

Chart VI - 1

WASHINGTON STATE WATER SUPPLY SYSTEM EXPENDITURES (DEFLATED)



SOURCE: GOVERNMENTAL FINANCES

Future Planning

All water systems with more than 1,000 service connections are required to submit a Water System Plan to DSHS. Such systems furnish drinking water to approximately 75% of the states population. Formal plan must include:

a. Basin planning data is composed of a general description of the water system's existing and future service area, an assessment of land use patterns and projected changes, present and projected population distributions, and present and projected water demand.

b. Inventory of existing water facilities.

c. Formulation of needed water system improvements including a projection of anticipated water system needs at least ten years into the future, a description of water source, storage, treatment, transmission and distribution "packages" to fulfill anticipated needs, including costs.

d. A time schedule to meet documented water system needs and a proposed financial program for obtaining planned improvements, including discussion concerning rates, various charges for new hook-ups and expansion policies.

Although 178 individual water supply planning programs are on file, they have not been synthesized to provide a comprehensive overview on a statewide basis of water needs and revenue sources to meet them. (The oversight role of DSHS appears to focus upon evaluating individual water systems.) In their formal planning procedures, most water systems use a 10-year horizon; some use a planning period as short as 2 years, others use a period of 35 years.

Capital Needs Projections

From the 178 plans on file, DSHS analyzed intentions pertaining to future capital spending for treatment, storage, and transmission/distribution. These

capital spending plans are summarized in Table VI-3. Total capital spending embodied in these plans amounts to more than $1.2 billion, with most of these project plans to be implemented within 10 to 15 years.

Table VI - 3

Capital Improvement Plans for 178 Public Water Systems
(mostly 1980 dollars)

Capital Need Category	Amount
Source/Treatment	$ 355,103,088
Storage	201,340,394
Transmission/Distribution	661,579,190
TOTAL	$1,218,022,672
Population Served	2,872,217

Source: Department of Social and Health Services.

Smaller water districts are not required to submit Water Plans with a capital improvement projection. It is possible to extrapolate capital needs, on a per capita basis, for the systems which serve 300-1,000 people. Adding these outlays to those of the larger systems leads to total capital costs of about $1.3 billion. In addition, there are approximately 7,500 public water systems ranging in size from 5-300 customers whose capital expenditures are difficult to project.

Projecting Future Expenditures

From data available in Governmental Finances (1970-1980), we know that average real expenditures (1972$) for operating/maintenance and capital expenditures are $20.60 on a per capita basis for the period 1970-1980. As shown in Table VI-4, both expenditure series are rather stable and maintain a fairly constant ratio.

Assuming per capita real outlays remain trendless, a population projection of 5,178,000 residents in the year 2000 implies real expenditures of $106.7 million (in 1972 dollars) at the turn of the century. Assuming an average inflation rate between 1972 and 2000 of 8% implies annual nominal expenditures (excluding interest expense) will become $920.8 million. If the ratio of operating and maintenance costs remains constant, then operating and maintenance cost can be estimated as $637 million and capital outlays as $284 million, based on projected total expenditures of $920 million in the year 2000.

Accumulated capital outlays for the entire period 1983-2000, during which the population is anticipated to grow by 1.1% per annum, totals $1,672 million when expressed in 1983 prices. This estimate of capital outlays is greater than the $1,304 million estimate of DSHS based on capital expenditure programs of water supply systems. However, many of the water system capital improvement plans are based on planning horizons somewhat shorter than the time period under consideration in this study, and for the most part are reported in 1980 price levels.

Neither of the above projections of capital outlays can be equated with needs. The capital improvement programs filed with DSHS are to some degree constrained by anticipated sources of funds to finance them. Moreover, the projections based on historical relations do not take into account the likely prospect of increasing incremental costs of expanding water supply systems.

Table VI - 4

Real Per Capita Water Expenditures (1972-1980, 1972$)

	Operating/ Maintenance	Capital Outlay
1970	$10.97	$ 8.17
1971	10.88	8.27
1972	11.62	8.57
1973	12.66	7.96
1974	12.63	10.38
1975	12.70	9.76
1976	13.98	9.19
1977	11.90	8.02
1978	12.67	9.49
1979	12.31	7.92
1980	11.57	4.96
Average	12.17	8.43

Source: Governmental Finance.

Needs are likely to be greater than either estimate, but a basis for further quantification of them is elusive.

Sources of Funding

Public water systems in Washington generate revenue from user fees charged by the individual suppliers. Rates vary from system to system to cover expenses. An analysis of rates and revenue structure is beyond the scope of this study.

Washington State has provided $80 million for 600 capital improvement projects developed by municipal water systems in the past ten years. The state provides up to 40% of the approved total cost and individual municipalities must provide the balance. To accomplish this, local governments have established local improvement districts, special assessments, or sought federal funds through the Farmers Home Administration, EDA, and Community Block Grants. In recent years, these federal funds have diminished and are available only for restricted or specialized uses, if at all. The major sources for state funding in recent years have been Referendum 27 (1972), House Bill 594 (1979), and Referendum 38 (1980). Referendum 27 provided $50 million for general obligation bonds for planning, acquisition, construction and improvement of non-agricultural water supply facilities. House Bill 594 authorized $10 million in 1979 primarily to provide transition from Referendum 27. Referendum 38 authorized $75 million for non-agricultural planning, design, acquisition and construction or improvement of water supply facilities.

The incremental costs of expanding water supply systems to accomodate economic growth are reported to be rising steeply. According to a spokesperson for the Association of Washington Water Districts, the issue has arisen as to who should pay for facilities expansion. Customers who paid for existing systems are resisting increases in their water rates to pay for the cost of

expanded facilities which will serve new customers (particularly large commercial or industrial water users). On the other hand, potential new industry is reluctant to bear the cost of expanding water systems (which may mean the acquisition of new reservoirs and reconstruction of a distribution system). The controversy is a divisive issue in the debate over who should pay for the cost of economic growth.

Water system revenues from operations are shown in Table VI-5. For all systems combined operating revenues have been sufficient to meet operating costs (including interest), but funding of capital expansion has been primarily from bond financing and federal or state aid.

TABLE VI - 5

Local Government Water Systems

Operating Revenues 1970-1980

(millions of dollars)

YEAR	NOMINAL REVENUES	1972 $ REVENUES*
1970	$ 50.0	$ 54.1
1971	53.6	55.5
1972	57.8	57.8
1973	72.5	68.6
1974	75.8	65.2
1975	85.1	68.0
1976	89.8	68.2
1977	92.6	66.5
1978	101.2	72.7
1979	122.2	75.2
1980	125.9	70.3

Source: Governmental Finances

*Deflator: Personal consumption

VII. IRRIGATION DISTRICTS

Almost from the beginning of the settlement of the Territory of Washington, individual farmers have diverted water from streams to irrigate crops, but the ability of the individual settlers to provide a workable irrigation system was hampered by high costs and legal difficulties. Private companies were also organized to develop irrigation systems to serve groups of farmers, but these proved to be financially unsuccessful. With encouragement from federal and state governments, new forms of irrigation organizations were formed which have been more effective in transmitting irrigation water over long distances and to higher elevations[1]. By 1978, 70% of all irrigated farmland in Washington was provided water by the various kinds of irrigation associations shown in Table VII-1.

Irrigation Districts

Irrigation Districts are public entities organized under Washington State statutes primarily for the purpose of providing water for irrigation from a source to the point of individual distribution by farmers. In 1978 these Irrigation Districts provided water to 22,835 farms and ranches in Washington State, and irrigation water for 911,562 acres of land. Seventy-seven percent of all acres irrigated by organizations were provided water by these 80 Irrigation Districts (The Department of Ecology indicates that there are 96 Irrigation Districts at present writing).

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[1] A brief historical sketch is provided by Jill L. Findeis and Norman K. Whittlesey, Competition Between Irrigation and Hydropower Water Use in Washington State, Report 44, Water Research Center (Pullman, Washington), June 1982. An extensive history is provided by Emmet K. Vandevere, History of Irrigation in Washington, PhD. Thesis, University of Washington (1948).

TABLE VII - 1

Type of Irrigation Organization and Acres Irrigated,
Washington State, 1978

	Number of Irrigation Organizations	Number of Acres Irrigated
Irrigation Districts	80	911,562
U.S. Bureau of Reclamation		
Bureau Operated	2	-
User Operated[1]	21	795,461
U.S. Bureau of Indian Affairs	4	140,886
Incorporated Mutual Associations	73	90,470
Unicorporated Mutuals	71	34,307
Commercial Firms	1	-
Total	231	1,177,225

[1] Not included in total since water is distributed by other types of organizations - principally Irrigation Districts.

Source: 1978 Census of Irrigation Associations.

Outlays of Irrigation Districts

The only accessible information concerning the outlays and revenues of Irrigation Districts is that provided by the 1978 Census of Agricultural Organizations. Seventy-eight reporting Irrigation Districts (which accounted for over 99% of acres irrigated and 89% of all water delivered by all districts) indicated operation and maintenance (O/M) expenses of $16.7 million. Adjusting for undercoverage and expressed in 1983 prices, outlays for all Irrigation Districts is estimated to be $30 million for the year 1978.

Capital spending for 1978 is not reported. However, the Census did gather data concerning new capital investments over the period of 1970 through 1978 for 37 Irrigation Districts (which accounted for 72% of water conveyed by all districts). New capital investment is defined to include expenditures by Irrigation Districts for new construction and improvements, but excludes payments made to the Bureau of Reclamation for facilities already constructed. This capital outlay data was utilized to estimate 1978 capital spending by assuming an even-flow of outlays over the 1970-78 interval. Adjusted to full coverage and expressed at 1983 price levels, Irrigation District capital outlays in 1978 are estimated to be $3.3 million. Total expenditures by Irrigation Districts are summarized in Table VII-2.

TABLE VII - 2

Estimated Expenditures of Irrigation Districts, 1978
(millions of dollars)

Operating and Maintenance Expense	$ 27,964,000	89.3 %
Capital Outlays	3,345,000	10.7
Total Expenditures	$ 31,309,000	100.0 %

Projection of Outlays Based on Irrigation Projections

Projections of future expenditures by Irrigation Districts are made by assuming the estimated real 1978 expenditures will increase in proportion to the expansion of irrigated land in Washington State.

Recent projections of the future growth of irrigation have been made by the Northwest Agricultural Development Project (undated, 1981?), the U.S. Water Resources Council (October, 1980), and the Pacific Northwest River Basins Commission (June, 1979). These growth rate projections (expressed in annualized growth rates) are shown in Table VII-3. Also shown are the implied trend level of expenditures by Irrigation Districts for the year 2000.

These projections of outlays for the year 2000 range form $37 to $44 million (in 1983 prices). It is likely that future irrigation outlays will be even greater since new lands brought into irrigation are more distant from sources of water and are at higher elevations. It is also likely that Irrigation Districts will increase their proportion of total lands subject to irrigation. Taking these factors into account, $50 million is taken as the trend level of total outlays by the year 2000. If the ratio of capital to total outlays of 10.7% (as estimated for 1978) is maintained, then accumulated capital outlays for Irrigation Districts over the entire period 1983 through 2000 would total $80 million, at 1983 price levels.

Projections of Irrigation District Capital Outlays Based on Planning Budgets

New capital outlays for irrigation are financed chiefly under joint agreements among Irrigation Districts, the State of Washington, and the U.S. Bureau of Reclamation. The actual construction of most irrigation projects which are now underway is undertaken by the Irrigation Districts, but some projects are constructed by the Bureau of Reclamation and subsequently turned over to Irrigation Districts for operation, and others are constructed by the State of

TABLE VII - 3

Projections of Irrigation Growth Rate and Irrigation District Outlays

	Irrigation Average Annual Growth Rate	Projected Irrigation District Expenditures, Year 2000 (in 1983 prices)
Northwest Agricultural Development Project, 1975/77 - 2000		
o Irrigated cropland	1.37%	$ 42.2 million
Water Resources Council, 1975-2000		
o Acres irrigated	1.40	42.5
o Water conveyed	0.75	36.9
o Water consumed	0.80	37.3
Pacific Northwest River Basins Commission, 1980 - 2000		
o Irrigation acreage based on OBERS population projection	1.30	41.9
o Irrigation acreage based on State of Washington population projection	1.60	44.4

Sources of irrigation projections:

Northwest Agricultural Development Project, Final Report. Prepared by the Northwest Agricultural Development Project, sponsored by the Pacific Northwest Regional Commission (undated, 1981?).

State Water Use and Socioeconomic Data Related to the Second National Water Assessment. U.S. Water Resource Council, prepared by Oak Ridge National Laboratory (October 1980).

Water Today and Tommorrow, Vol. III, The States. Pacific Northwest River Basins Commission (June 1979).

Washington. The variety of arrangements for financing and construction of irrigation facilities, as well as the varying time horizons involved in the construction of individual projects, complicates the analysis of Irrigation Districts capital outlays. It is possible to get some indication of the general magnitude of outlays over the next several years from DOE status reports and Bureau of Reclamation planning budgets.

(a) The Department of Ecology Programs

The Department of Ecology (DOE) is the state agency responsible for the planning, allocation, and management of water resources of the State of Washington. In this capacity it is the state agency responsible for the administration of state grants and loans to Irrigation Districts. The active programs by which the State of Washington provides assistance to Irrigation Districts are:

- o Referendum 27 (enacted 1972), which designated $25 million for agricultural water supply through a revolving fund.
- o Emergency Water Supply program (enacted 1977), form which $18 million in grants and loans have been made to Irrigation Districts through the end of FY 1982.
- o Referendum 38 (enacted 1980), which designated $50 million for agricultural water supply and other purposes.

According to the Department of Ecology, there are 13 applicants/projects with potential irrigation projects in various stages of the funding process which might be supported from the funding sources cited.[1] State support for on-going and contemplated projects amounts to nearly $30 million. When combined with other sources of project funding (notably the Bureau of Reclamation) the

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[1] DOE, Washington's Water Resources Program (January 1983).

estimated total project costs are about $58 million. Not all of these projects are certain to be funded, and the time-phasing varies. Some projects are certain to be completed in the next two years, others are still in the conceptual stage. Most of the project costs would represent capital expenditures actually made by Irrigation Districts during the present decade.

(b) The Bureau of Reclamation Programs

Expenditure estimates from the Bureau of Reclamation for on-going programs over the next six years within Washington State offer a somewhat different perspective on future Irrigation District capital outlays. The Bureau of Reclamation six-year planning budget for fiscal years 1983-88 incorporates an expenditure program of $207 million (in 1983 price levels). Planned expenditure for rehabilitation of existing irrigation facilities amounts to $176 million, and new irrigation outlays are approximately $32 million. Most of the expenditures in the planning budget would be in the form of loans to Irrigation Districts, and typically carry a 15% matching requirement from the State of Washington. The Bureau of Reclamation also notes that if negotiations are successful for the completion of the Columbia Basin Project, a significant increase in expenditures for new irrigation facilities could be realized in the late 1980's and continue past the year 2000.

Capital Outlays Projection

Any projection of future outlays by Irrigation Districts involves considerable uncertainty. The principal sources of uncertaintly revolve about (a) the long-term prospects for agricultural product prices, (b) the rising costs of energy used to pump water through the irrigation systems, and (c) the continued availability of federal interest-free loans to finance Irrigation District capital spending and the required state matching funds.

A much higher level of future expenditures by Irrigation Districts is

implied in the perspective offered by the Bureau of Reclamation as compared to that suggested by the Department of Ecology. From the fragmentary information which is available, it is difficult to define even a narrow ranger within which expenditures are likely to fall. The extension of past outlays reported by the Census of Irrigation Associations on the basis of the forecasted growth of water needs appears conservative in the light of pending projects for the near term. Until more intensive studies can be undertaken, we venture that expenditures are likely to fall within a range of $100 million to $300 million. We use $200 million as a midpoint estimate of cumulative capital outlays by Irrigation Districts over the period 1983-2000 (1983 price levels).

Capital Needs

No estimates of capital needs by Irrigation Districts were found. Since users are assessed the cost of maintaining irrigation system in proportion to their access and use, financial feasibility to farm and ranch enterprises is of over-riding importance. This, in turn, revolves about market circumstances, and in particular the anticipated market prices of agricultural products and the unit costs of production with and without additional irrigation development.

The economic potential for further irrigation development in Washington State has been the subject of several inquiries. A 1976 irrigation planning study questioned the financial feasibility fo expanded irrigation:

> "Analysis of irrigation feasibility shows little or no profit can be expected from irrigation development in the state at this time. There appears to be little reason for optimism for its being a highly profitable venture in the next decade. Costs of production and irrigation are high. The market prices for most products produced under irrigation in Washington are fair but provide little hope of getting stronger for an extended period." [1]

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1 Benefits and Costs of Irrigation Development in Washington, Vol.1, P.3. Department of Agricultural Economics, College of Agriculture, Washington State University (October 1976).

A more recent report summarized the continuing debate over the financial feasibility of specific irrigation projects:

> CH2M-Hill (n.d.) and Whittlesey et al (1981) analysed the economic feasibility of additional irrigation in the Horse Heaven Hills and in the East High Project and Horse Heaven Hills, respectively. Both studies conclude that at this time development of these areas is not economically feasible....However, despite these findings, proponents of project development continue to support development, citing the existence of significant secondary benefits (e.g., increases in employment, wildlife enhancement, etc.), while opponents counter that significant secondary costs also exist.....Analysing the social overhead costs and the cost of hydropower lost and used as a result or irrigation development in the East High Project and Horse Heaven Hills, Whittlesey et al (1978) show that those costs are large...." [1]

Yet, the outlook for the economic feasibility of expanded irrigation is viewed more sanguinely by other experts. McKusick and McCarl conclude their assessment of the prospects for the intermediate and longer term with a more hopeful note;

> "After 1986 we are optimistic, given the competitiveness of Pacific Northwest Agriculture, that there will be renewed interest in irrigation development to bring in additional 800,000 acres of irrigation development by the year 2000." 2

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[1] Findeis and Whittesey, op.cit., P. 28.

[2] Robert McKusick and Bruce McCarl "alternative futures of irrigated agriculture in the Pacific Northwest", Proceedings of the 1983 Agricultural Conference Days, February 28 - March 4, 1983.

VIII. SEWAGE

Sewage treatment plants are essential to protect the public health from waterborne disease and to abate pollution of public watercourses and contamination of water supplies. Sanitary sewage system facilities are often combined with stormwater drainage collection facilities to remove water from streets and to prevent surface flooding. Sewage facilities include both sewage treatment plants and the system of lateral and trunk sewers which collect waste waters.

In Washington State, community facilities for the removal of waste waters are a public function operated by counties, cities and towns and by 58 special purpose sewage districts. There are 230 systems or plants which provide for the treatment of sewage, and another 65 public sanitary sewage systems which either discharge waste water without treatment or discharge to a treatment facility controlled by another jurisdiction. In addition, in 152 communities the primary method of wastewater disposal was by means of individual on-site disposal, usually septic tanks and drain fields.

While 60% of the resident population in Washington are presently served by sewage authorities with facilities for wastewater treatment, EPA goals are that 88% of the population be served by sewer systems with complete facilities for raw wastewater treatment. Presently, only 14% of the population is served by sewage facilities which provide for secondary treatment, but Environmental Protection Administration goals envision that 66% of the population will be so served by the year 2000.

Expenditures and Funding for Sewage

Total expenditures for waste water control in Washington State have increased from about $55 million in the early 1970's to about $150 million in the early 1980's, as shown in Table VIII-1. After allowing for inflation the amount

that could be purchased increased only modestly. Operating and maintenance expenditures have been steadily rising, but real capital spending has fluctuated erratically with no decisive trend, as can be seen in Table VIII-1 and Chart VIII-1.

Funding of sewage capital expenditures in Washington State has been primarily from federal and state grants. During the past decade, federal grants from the Environmental Protection Agency (EPA) under the Clean Water Act have totaled about $501 million, state grants about $194 million, while local matching funds provided about $100 million (see Table VIII-2 and Chart VIII-2). The variability in grants authorized and differences in timing between grants and outlays accounts for the irregularity in sewage capital construction expenditures.

The administration and distribution to municipalities of federal and state funds for wastewater programs is undertaken by the Washington Department of Ecology (DOE). DOE annually prepares a list of priority municipal projects for funding by the EPA. DOE also administers the distribution of funds under three state bond programs (Referendum 17 (1968), 26 (1972), and 39 (1980)). Both federal and state aid programs to assist community sewage construction are restricted to treatment facilities and interceptors; pipelines which collect wastes are generally not aid eligible.

Estimates of Future Needs

The 1982 Needs Survey conducted by the Environmental Protection Agency, has estimated that the backlog of sewage wastewater construction spending needs in Washington State to meet current EPA goals amounts to $2,726 million dollars.

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[1] 1982 Needs Survey: Cost Estimate for Construction of Publicly Owned Waste Water Treatment Facilities, Office of Water Program Operation, Environmental Protection Administration (December 31, 1982)

TABLE VIII - 1

Expenditures for Sewage and Storm Sewage,

All Governments in Washington State, 1970 - 1980
($ millions)

Fiscal Year	Nominal			Real ($ 72)		
	Total Expenditures	O/M	Capital	Total Expenditures	O/M	Capital
1970-71	$ 66.8	15.6	40.2	63.4	18.0	45.4
1971-72	55.3	18.5	36.8	58.8	19.7	39.1
1972-73	87.3	20.3	67.0	87.3	20.3	67.0
1973-74	78.1	24.4	53.7	72.9	22.7	50.2
1974-75	103.8	30.8	73.0	87.6	24.1	63.5
1975-76	102.8	37.4	65.3	78.8	26.7	52.1
1976-77	93.8	42.4	51.3	67.3	29.6	37.7
1977-78	99.5	49.2	50.3	66.8	32.4	34.4
1978-79	160.8	58.5	102.3	99.5	34.1	65.4
1979-80	176.5	72.6	103.9	98.6	36.8	61.8
1980-81	149.1	82.0	67.1	73.7	37.1	36.6

Source: Governmental Finances, deflated by BEA price deflaters.

CHART VIII - 1

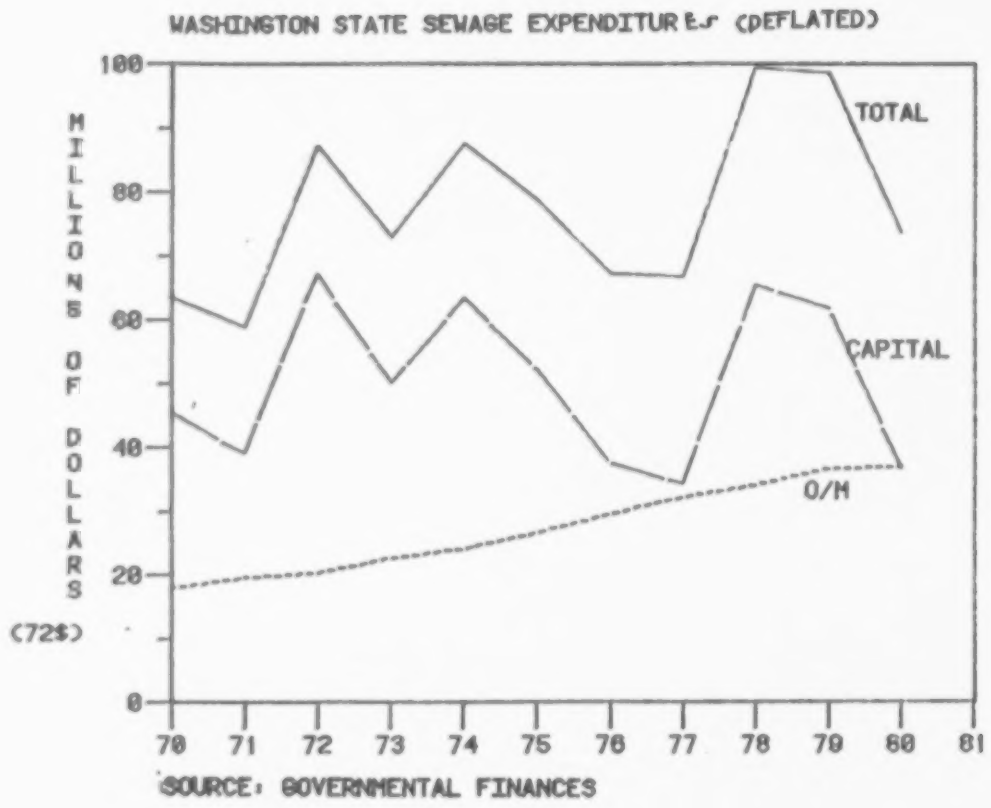

WASHINGTON STATE SEWAGE EXPENDITURES (DEFLATED)
MILLIONS OF DOLLARS
(72$)
100
80
60
40
20
0
TOTAL
CAPITAL
O/M
70
71
72
73
74
75
76
77
78
79
80
81
SOURCE: GOVERNMENTAL FINANCES

TABLE VIII - 2

CONSTRUCTION GRANTS FOR MUNICIPAL SEWAGE TREATMENT FACILITIES

Dollars in Thousands

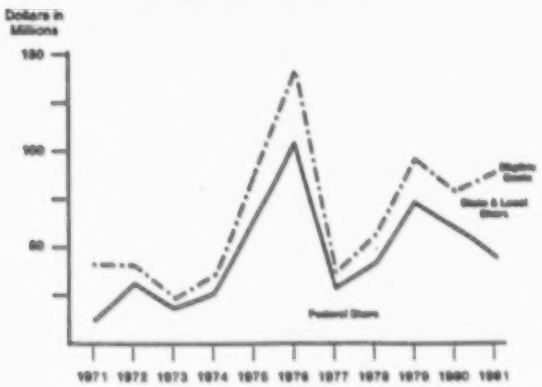
Fiscal Year	Eligible Costs	Federal Share	State Share	Local Share
1971	42,000	12,651	6,320	23,030
1972	40,520	30,340	6,080	4,100
1973	23,750	17,810	3,562	2,378
1974	35,624	26,718	5,344	3,562
1975	86,307	64,731	12,946	8,631
1976	138,554	103,916	20,783	13,855
1977	36,693	27,520	5,504	3,669
1978	55,818	41,863	8,373	5,582
1979	95,897	71,923	14,385	9,590
1980	79,180	59,300	21,900	7,900
1981	87,900	44,900	23,400	20,500

Source: DCE

CHART VIII - 2

CONTRUCTION GRANTS

FOR MUNICIPAL SEWAGE TREATMENT FACILITIES



To abate pollution in urbanized areas of Washington State from stormwater runoff requires an additional expenditure of $2,842 million. These are estimates of the dollar costs (January 1982 prices) of providing treatment service to the 1980 population levels for abatement of existing pollution problems (see Table VIII-3).

The EPA has also made estimates of the costs (in 1982 dollars) of meeting future needs to the year 2000, allowing for the expected growth of Washington State population. Coupled with the backlog of unmet needs, future capital spending for sewers and stormwater control over the remaining 18 years of this century amounts to $6.6 billion dollars (1982$).

The Association of Washington Cities describes another barometer as indicative of the funding needs of sewer utilities. They report that DOE recently received applications for Referendum 39 funds involving project costs of $552 million by 68 agencies, and that only twenty of these applications were accepted and funded (50% local matching) from the $235 million of available state funds. Presumably many sewer districts or cities did not apply for funding because of the 50% matching requirement, because their particular sewage facilities needs were not eligible for funding, or because only the highest priority needs would be funded. Many of the denied applications pointed out the health risks from spills of raw sewage from overloaded systems; frequent water quality violations, septic tank and cesspool created health risks, system overflows of raw sewage to nearby ditches, lakes or waterways, undersized interceptor pipelines which threaten aquifers, or sewer systems unable to serve new customers with their existing plants.

TABLE VIII - 3

EPA Estimates of 1980 Needs Backlog,
and Needs to Meet Goals for 2000
(millions of dollars, 1982 prices)

Expenditures in January 1982 $, Facilities Category:	1982 Estimated Backlog of Needed Construction to Meet 1982 Goals	1982 Estimate to Meet EPA Needs for Year 2000
Secondary treatment	$ 465	$ 876
Advanced treatment (AST, AT)	17	24
Infiltration/Inflow correction	116	115
Major sewer rehabilitation	63	63
New collectors	528	685
New interceptors	284	724
Overflow correction	1,292	1,293
Control of stormwaters	2,842	2,842
Total	5,608	6,623

Source: 1982 Needs Survey, EPA, December 31, 1982.

Future Capital Outlays

No estimate of future capital outlays were available. To provide an indication of the probable capital expenditures we made an estimate of the trend-adjusted capital outlays for 1980 (trend-adjusted to avoid the irregular movement in actual outlays), and extrapolated this level through the year 2000 on the basis of anticipated population growth. Between the years 1983 and 2000 the accumulated capital outlays would amount to $2,621 million (in 1983 prices) if expenditures grow proportionate to the increase in state population.

Sources of Funding

Funding of the multi-billion dollar needs for wastewater treatment plants and for stormwater control reported by the EPA appears as an incredibly difficult, perhaps impossible challenge. The DOE estimates that only $212 million in assistance will become available from the EPA in the 1983-87 interval. Like water users, those customers presently served by sewer utilities are resistant to pay higher rates to finance the expansion of capacity to serve new customers.[1] Local governments ask: "Is local government responsible for clean water?" (AWC, City News, December 1982). State government in Washington is faced with severe budget problems, and while state bond issues are a part of the solution, the many demands upon state bonding authority, constitutional limitations upon debt, a deteriorating credit rating, and resistance of bond markets to Washington issues pending resolution of the Washington Public Power Supply Agency bond crisis makes the financial provision for meeting future needs for sewers according to EPA standards virtually unresolvable.

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[1] A King County Study estimates that "the average investment in new sewer facilities for each home built outside Seattle will be about $9,000. In comparison, each new home will typically generate only one or two percent of this amount in revenue annually". See Capital Needs and New Financing Assessment for Local Governments in King County, King Subregional Council, December, 1982.